

THE GENERA *MITHRAX* LATREILLE, 1818 AND *MITHRACULUS* WHITE, 1847 (CRUSTACEA: BRACHYURA: MAJIDAE) IN THE WESTERN ATLANTIC OCEAN

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Wagner, H.P. The genera *Mithrax* Latreille, 1818 and *Mithraculus* White, 1847 (Crustacea: Brachyura: Majidae) in the western Atlantic Ocean.

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Key words: Crustacea; Brachyura; Majidae; *Mithrax*; *Mithraculus*; keys; species.

The Western Atlantic species formerly assigned to the (sub)genera *Mithrax* and *Mithraculus* are revised. *Mithrax* and *Mithraculus* are treated here as two distinct genera based on seven (relative) constant generic characters, keys to the various species are given. All species are discussed with full account of their synonymy and distribution.

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Introduction

In Rathbun's "The spider crabs of America" (1925) an account is given of the Pacific and Atlantic American spider crabs. Garth (1958) revised the American

species of the Pacific coast, but no recent revision of the Atlantic American spider crabs is published since 1925. The present contribution distinguishes *Mithrax* Latreille, 1818, and *Mithraculus* White, 1847, as different genera and revises the species from the Western Atlantic coast with full account on their synonymy and distribution.

Spider crabs in contrary to most other crabs have a different physiology that leads to a stop of molting after puberty (Skinner, 1985: 54). As in spider crabs the puberty moult can take place in certain animals that have not reached their full size, such precocious animals retain their juvenile characters (e.g. size) in principle, but on the other hand, when becoming older, are generally smoother than juvenile specimens of equal size, as their spines wear off. This results in the phenomenon that each species, even within the same population, can consist out of smooth, tuberculous and spinous individuals. Also bodysize varies considerably among the adults of each species, this depending on the moment of hormonal changes within the individual as result of mating. Therefore it is not surprising that authors unaware of this phenomenon described many of these forms as separate species. Growth series and the male gonopod morphology are among the more important characters used in this study. The importance to recognize species on basis of the male gonopod morphology was shown for many species of spider crabs along the Pacific American coast by Garth (1958) who relegated into synonymy many species that were recognized by Rathbun (1925) as distinct species.

Therefore, to revise groups like the present, it is necessary to study large series of each species. For the two genera treated here my conclusions are based on an examination of 4375 specimens, all present in the collections of the Rijksmuseum van Natuurlijke Historie, Leiden (RMNH), Instituut voor Taxonomische Zoölogie (Zoölogisch Museum), Amsterdam (ZMA), Senckenberg Museum, Senckenberg (SMF), Zoologisk Museum Copenhagen (ZMC), additional and type material from the Smithsonian Institution, Washington D.C. (USNM) and Museum National d'Histoire Naturelle, Paris (MP). Of the 4375 specimens mentioned above 489 specimens belong to *Mithrax* and 3886 specimens to *Mithraculus*. Some of the collectors of the material examined are abbreviated, viz., P. Wagenaar Hummelinck (PWH), L. B. Holthuis (LBH) and H. G. Müller (HGM).

Systematics

When, in 1847 White created the genus *Mithraculus* he did so because he was of the opinion that this group of species was generically distinct from *Mithrax*. Many later authors followed him in the use of *Mithraculus* as a good genus. The turning point came around 1880 when the genus was treated mostly as a subgenus of *Mithrax* or even put into its synonymy. It has been a subject of debate since whether *Mithraculus* is a synonym, a subgenus or a genus in itself. In my opinion we have to deal here with two distinct genera, even though some of the characters used are not always absolute and sometimes overlap. In general the two genera differ in the following characters:

<i>Mithrax</i> :	<i>Mithraculus</i> :
- Tubercles and spines on the branchial regions	- Branchial regions without or with transverse grooves, forming tuberculous prominences.
- Upper surface of the carapace always with clearly visible hairs.	- Upper surface of the carapace naked to the unaided eye.
- Two to four spines on the basal antennal segment, of which one on the lateral margin of the segment.	- Only two spines on the basal antennal segment, both placed on the anterior margin.
- Spooned tips of fingers rarely with tufts of hair(s).	- Spooned tips of fingers always with tufts of hair(s).
- Chelipeds of fully adult males with a tooth on the dactylus only. (<i>Mithrax hemphilli</i> excepted)	- Chelipeds of fully adult males with a tooth on both dactylus and propodus (<i>Mithraculus ruber</i> excepted).
- Anterolateral spines of carapace generally digitate.	- Anterolateral tubercles or spines never digitate.
- Generally the carapace is longer than broad (except in juveniles and <i>Mithrax verrucosus</i>).	- Generally the carapace is broader than long (except in juveniles and <i>Mithraculus cinctimanus</i>).

Mithrax Latreille, 1818

Les *Mithrax*, Latreille in Cuvier, 1816: 23.

Mithrax Latreille, 1818: 224 (type: *Cancer aculeatus* Herbst, 1790 (= *Mithrax pilosus* Rathbun, 1892), by subsequent designation by H. Milne Edwards, 1838: pl. 27; gender: masculine).

Trachonite, Latreille, 1818: 224.

Trachonites Desmarest, 1823: 263 (type: *Cancer hispidus* Herbst, 1790 by subsequent designation by Rathbun, 1925: 379).

Nemausa A. Milne Edwards, 1875: 80 (type: *Pisa spinipes* Bell, 1835, by subsequent designation by Miers, 1879: 666).

Carapace convex, generally longer than broad, covered with distinct hairs and spines. Front incised in middle, forming two pointed or truncate rostral horns. Basal antennal segment with two to four tubercles or spines. Orbital margins with spines or tubercles.

Anterolateral margin bearing usually four more or less digitated spines or lobes behind the orbit; posterolateral margin sometimes having spines or tubercles also. Branchial regions with tubercles.

Chelipeds long and strong in fully adult specimens; chelae with deeply hollowed spoonshaped tips, fingers gaping when closed. In the fully adult male cheliped a tooth present on the dactylus only. Ambulatory legs robust, armed with spines, and ending in hooked dactyli; lower margin of dactyli often armed with several spinules.

Abdomen in both sexes with seven free segments.

Key to the western Atlantic species of *Mithrax* Latreille

1. Upper surface of the carapace not paved with closely set truncated granules or tubercles 2

- Upper surface of the carapace with spines or granules, and paved with closely set truncated granules or tubercles 6
- 2. Species relatively small. Upper surface of the carapace more or less densely covered with hairs. Basal antennal segment with three or four spines or tubercles ... 3
- Species relatively large. Upper surface with only few short hairs. Basal antennal segment with two spines or tubercles 5
- 3. Carapace distinctly longer than wide. Rostrum long, pointed and narrow. Palm of chela usually armed with one row of up to four tubercles, sometimes two rows *M. cornutus* de Saussure, p. 6
- Carapace about as long as wide. Rostrum short and broad. Palm of chela unarmed 4
- 4. Carapace slightly longer than wide, generally exceeding 16 mm in length. Rostrum broad and triangular. Three tubercles on basal antennal segment *M. holderi* Stimpson, p. 10
- Carapace slightly broader than long, not exceeding 16 mm in length. Rostrum blunt and very broad. Three tubercles on basal antennal segment, if a fourth is present it is small and placed on the base of the second (middle) tubercle. *M. brasiliensis* Rathbun, p. 13
- 5. Rostrum relatively long and obliquely truncate. No posterolateral spines on the carapace. Palm armed with an irregular row of up to 11 tubercles. Carpus of the cheliped with long spines *M. spinosissimus* (Lamarck), p. 14
- Rostrum short and blunt. Three rows of tubercles posterolaterally on the carapace near the margin. Palm of the cheliped smooth. Carpus of the cheliped smooth or somewhat uneven *M. hispidus* (Herbst), p. 17
- 6. Relatively small species. Granules on the tubercles of the upper surface of the carapace. Four tubercles on the basal antennal segment. Orbit armed with one spine below and three above. Carpus of cheliped without hairs, but with numerous small tubercles *M. hemphilli* Rathbun, p. 23
- Relatively large species. No granules on the tubercles, but the whole upper surface of the carapace is covered with closely set granules. Three spines on the basal antennal segment. Orbit armed with one spine below and four above. Carpus of the cheliped with some hairs and with long pointed spines 7
- 7. Carapace generally longer than broad, covered with a dense pile of long hairs. Colour generally reddish brown. Rostral horns long and distally bent inwards. Second basal antennal spine distinctly longer than the other two. Palm of chela with up to four tubercles and hairs in the proximal part *M. pilosus* Rathbun, p. 25
- Carapace generally broader than long, not densely covered with hairs. Colour generally vinous red to violet. Rostral horns short and distally carrying spinules. Second basal antennal spine somewhat longer than the other two. Palm of chela naked and unarmed or (rarely) armed with one or two tubercles in the proximal part *M. verrucosus* H. Milne Edwards, p. 29

Mithrax cornutus de Saussure, 1857
(figs. 1-4)

Mithrax cornutus de Saussure, 1857: 501; de Saussure, 1858: 423; de Saussure, 1858a: 7; A. Milne Edwards, 1875: 97; A. Milne Edwards, 1878: pl. 22; Miers, 1886: 86, 87; Moreira, 1901: 62; Verrill, 1908: 400, fig. 38; Abele & Kim, 1986: 522, 523 figs. d-e.

Mithrax acuticornis Stimpson, 1871: 116; A. Milne Edwards, 1875: 98; Miers, 1886: 86; Rathbun, 1900: 512, fig. 8; Rathbun, 1901: 66; A. Milne Edwards & Bouvier, 1923: 390, figs. 22-23; Rathbun, 1933: 29, fig. 28; Schmidt, 1939: 29; Wass, 1955: 171; Jones, 1969: 380; Valdés-Muñoz, 1986: 10; Abele & Kim, 1986: 522, 523 figs. fig.

Nemausea rostrata A. Milne Edwards, 1875: 81, pl. 17 fig. 4.

Mithrax (Nemausea) rostrata; Miers, 1886: 85; Rankin, 1900: 532; Young, 1900: 87.

Mithrax spec., Kendall, 1891: 303.

Mithrax (Nemausea) acuticornis; Rathbun, 1892: 260; Rathbun, 1898: 259; Verrill, 1908: 403, fig. 39.

Mithrax (Mithrax) cornutus; Young, 1900: 88; Rathbun, 1925: 386, pl. 136 figs. 1-2, pl. 256; Boone, 1930: 96, pl. 28 fig. B; Chace, 1956a: 21; Bullis & Thompson, 1965: 12; Coelho & Ramos, 1972: 214; Gomez & Ortiz, 1976: 15; Powers, 1977: 56.

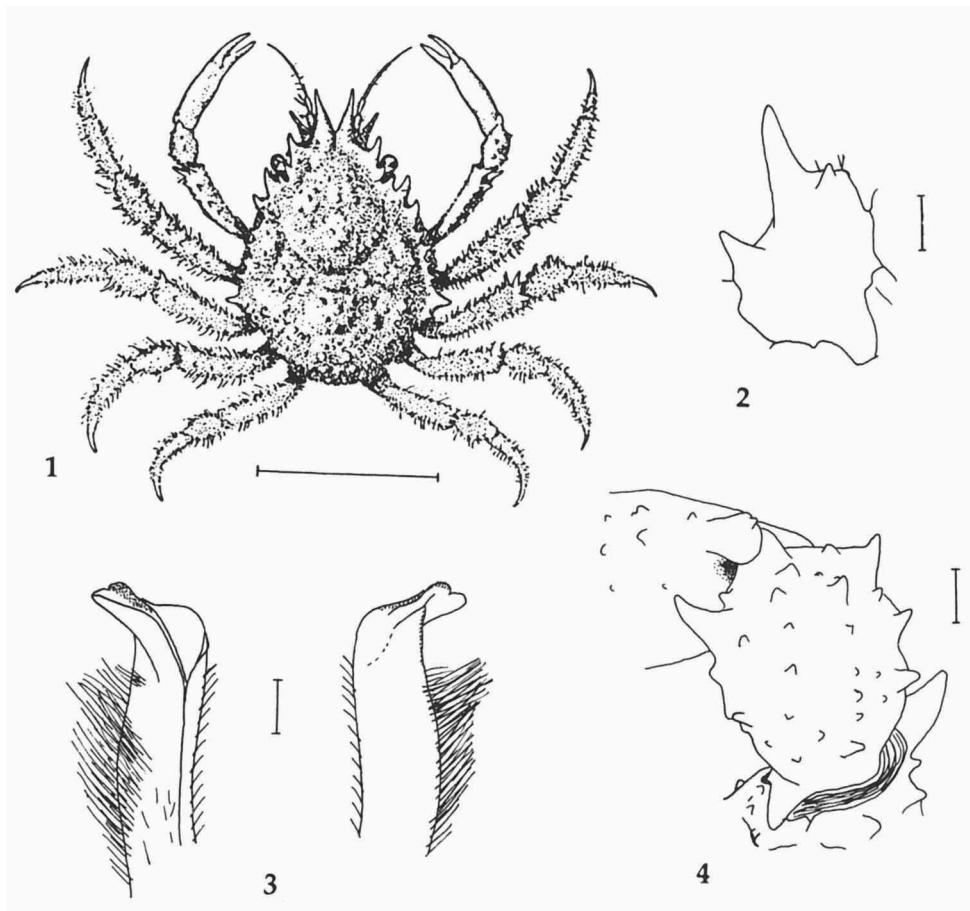
Mithrax acuticornis?; Rathbun, 1921: 82.

Mithrax (Mithrax) acuticornis; Rathbun, 1925: 388, pl. 136 figs. 1-2, pl. 257 fig. 1; Boone, 1930: 93, pl. 29 fig. A; Coêlho, 1969: 237; Coêlho, 1971: 140; Coêlho & Ramos, 1972: 214; Felder, 1973: 52, fig. 10; Gomez & Ortiz, 1976: 15; Powers, 1977: 56; Garth, 1978: 330; Williams, 1984: 332, figs. 267, 275a.

Material.— **U.S.A., Florida.**— Off St. Lucie Inlet: 1 juv. ♀ (BMNH 1980: 549), 27°10'8" N 80°00'8" W, 44.2 m., 3.xi.1977, R/V Johsnon sta. 2161B, leg. F. Stanton, don. USNM & Fort Pierce Bureau; 1 ♀ (ZMC), 27°32'8" N 79°58'8" W, 80 m., 7.ii.1977, R/V Johnson sta. 2163B, leg. R. Gore; 1 juv. ♂ (MP B-6430), 27°32'8" N 79°58'8" W, 15.iv.1977, R/V Johnson, leg. F. Stanton.— Florida Straits, off the east coast: 4 ♂♂, 1 juv. ♀ (RMNH D 15663), 27°30'N 80°00'W, 14-81 fathoms (= 25.6-148.1 m.), "Silver Bay" Expedition, don. USNM.— Florida Straits: 1 ♂ (RMNH D 37066), 26°36'N 80°00'W, 5' screen dredge, 73-82 m., 22.ix.1964, Gerda sta. 408; 1 ovig. ♀ (USNM), 26°36'N 79°59'W, 10' ottertrawl, 37 m., 22.ix.1964, Gerda sta. 412; 1 ♂ (USNM), 24°33'N 83°09'W, 10' ottertrawl, 68 m., 12.iv.1965, Gerda sta. 564. **Cuba.**— Off Havana: 1 carapace (USNM 9502), 23°10'48" N 82°19'15" W, 121 fathoms (= 221.3 m.), 17.i.1885, Albatross sta. 2330, fne. gy. Co. Between Jamaica and Haiti (Hispaniola).— 1 ♂ (USNM 7760), 17°43'40" N 75°38'25" W, 52 fathoms (= 95.1 m.), 29.ii.1884, Albatross sta. 2136. **Dominica.**— 1 ♀ (USNM 32717), leg. A. H. Verrill. **Martinique.**— 1 ♀ (MP B-473), leg. Bellanger; 1 ♂ (MP B-4560), leg. Bellanger; 1 ♂ (MP B-474), leg. Chaffanjon. **Gulf of Panama.**— 1 ♂ (RMNH D 37061), 21°10'N 86°18'W, 10' ottertrawl, 284-458 m., 23.v.1967, Pillsbury sta. P-582. **Panama.**— Colon to Gulf of San Blas (Colombia): 1 ovig. ♀ (RMNH D 37064), 9°37.5'N 78°54'W, 10' ottertrawl, 64-128 m., 8.vii.1966, Pillsbury sta. P-330. **Colombia.**— San Blas Point to Gulf of Mosquitos: 1 juv. ♀ (RMNH D 37063), 1 ♂, 1 juv. ♀ (USNM), 9°38.9'N 79°15.3'W, 10' ottertrawl, 64-70 m., 19.vii.1966, Pillsbury sta. P-425; 2 ♂♂ (RMNH D 37065), 9°31'N 79°51'W, 10' ottertrawl, 60-64 m., 20.vii.1966, Pillsbury sta. P-430.— Gulf of Mosquitos: 1 ♂, 1 juv. ♀ (RMNH D 37060), 11 ♂♂ (5 juv.), 5 juv. ♀♀ (USNM), 9°14.6'N 80°21.8'W, 10' ottertrawl, 48-49 m., 20.vii.1966, Pillsbury sta. P-434.— Gulf of Uraba to Cartagena: 1 ♂ (RMNH D 37059), 9°31.3'N 76°15.4'W, 10' ottertrawl, 56-58 m., 13.vii.1966, Pillsbury sta. P-365. **Tobago.**— Windward Island: 1 juv. ♀ (BMNH 1938.3.29.52), leg. K. Tatton.

Bermuda.— Off Castle Roads: 2 ♂♂, 2 ♀♀ (1 ovig.) (BMNH 1984: 136), 146 m., 14.viii.1976, R/N North Star Expeditions, leg. J.H.K. Lightborne, don. Biostation Bermuda.— Ca. 2 miles out of Castle Roads, S shore; 1 ♂, 1 ovig. ♀ (BMNH), 16.x.1976, R/N North Star Expeditions, leg. J.H.R. Lightbourne, don. Biostation Bermuda. **Brazil.**— Bahia: 1 ♂ (ZMC), Challenger Exped., don. BMNH 1891.

Description.— The carapace is distinctly longer than broad. Its surface is covered with sharp spines which are very short and few in number on the gastric region, longer and more numerous elsewhere. The rostrum is bifid, the tips regularly tapering and directed straight forwards, except for the distal parts which converge slightly. Length of rostrum up to one third of length of remainder of carapace. Basal antennal segment with three spines. Of these the first, situated near the base of the first movable article, is very small, the second is the most prominent and the third half as long as the second. The antennae are about as long as the carapace and bordered lat-



Figs. 1-4. *Mithrax cornutus* de Saussure, 1857: 1. dorsal view of the (young) animal (after Rathbun, 1892), 10 mm indicated; 2. right basal antennal segment (BMNH 1984: 136); 3. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (BMNH 1984: 136); 4. carpus of right cheliped (BMNH 1984: 136); 2-4. 2 mm indicated.

erally by hairs. The orbit is armed with one small spine below (not counting the third basal antennal spine), one at the outer angle and four above. The four dorsal spines consist of one preorbital spine and one postorbital spine, and two smaller spines in between. The carapace has four large anterolateral spines and one posterolateral spine; the first anterolateral spine, situated on the hepatic region, is double; the next three all have a small spine in front. The four anterolateral spines increase in size posteriorly; the posterolateral spine is the smallest.

The chelipeds of the male are nearly as long and stout as the first pair of ambulatory legs; the merus has three rows of spines, those of the two dorsal rows long; the carpus is covered with short, conical, subacute spines or tubercles, three of which are on the upper inner margin and a larger one lower on the inner margin; the palm has one (in small specimens) or two distinct row(s) of up to nine irregularly sized spinules on the upper edge, in the largest individual studied there is a third row of very

tiny tubercles; the fingers have a short narrow gape; the cutting edges are denticulate, and there is a larger denticle in the middle of the edge of the dactylus. The first pair of ambulatory legs is 1.25 times as long as the carapace (including the rostrum). The spines on the ambulatory legs are arranged in two dorsal rows on the merus and carpus; these spines are longest in the first two (or three) pairs of ambulatory legs. The propodus and dactylus are without spines, but the hairs are denser there than on the merus and carpus.

The male gonopod is stout and bent, with hairs on the inner and outer edge. It is dorsoventrally flattened, the tip is truncate, somewhat rounded internally and pointed on the outside. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.—The largest specimen at my disposal is a male of 93.0 mm long (including the rostrum) and 77.5 mm wide (excluding the spines) (MP B-4560).

Colour.—Deep red-orange, fingers somewhat purplish red with narrow white bands near their bases (Henderson in Rathbun, 1925). De Saussure mentioned the colour as being yellowish or rosy, often rose-colour (Rathbun, 1925); De Saussure's description fits well for the dried and spirit specimens that I examined. Typical is the red or reddish brown dot in front of the mouth that is visible in recently collected or fresh specimens, a character not seen in any other species of the genus, and persisting for some time in preserved material.

Remarks.—This species, from deeper water is rather variable in its characters. However, it shows this variability in the general shape (larger specimens are more rounded than smaller ones) and, to a lesser extent, in the spinulation; intermediate forms are found in all larger samples. I see therefore no reason to maintain *M. acuticornis* and *M. cornutus* as distinct species, as those characters in which they should differ according to previous authors are those variable ones mentioned above, which resulted in regarding the small, elongate forms as *M. acuticornis*, and the rounded big forms as *M. cornutus*. As the name *M. cornutus* is oldest it has priority over *M. acuticornis*.

Rathbun (1925) compares this species with *M. spinosissimus* (Lamarck, 1818). It is true that in young *M. spinosissimus* the carapace is much narrower than in adult specimens, but the absence of a spine near the articulation of the first movable article of the antennae with the basal antennal segment, the short rostrum with laterally up to three spinules on the horns, the less dense pile, and the regular convex gastric region in respect to the other regions cannot lead to any misidentifications of *M. spinosissimus* with *M. cornutus*.

The species lives in deeper waters than most of the other *Mithrax* species discussed here. It occurs between 20 and 458 m depth.

Distribution.—The species is reported in the literature from the following localities: Caribbean Sea (Rathbun, 1892, 1901), Bermuda (Rathbun, 1901; Verrill, 1908), Florida, U.S.A. (Stimpson, 1871; Miers, 1886; Rathbun, 1898, 1925; Verrill, 1908; Bullis & Thompson, 1965), Gulf of Mexico (Rathbun, 1892, 1901; Verrill, 1908; Chace, 1956a; Powers, 1977), Texas, U.S.A. (Felder, 1973), Mexico (A. Milne Edwards & Bouvier, 1923), Yucatan Channel (Rathbun, 1925), Antilles (De Saussure, 1857, 1858, 1858a; Rathbun, 1925), West Indies (Verrill, 1908), Bahamas (Boone, 1930; Garth, 1978), Cuba (Rathbun, 1898, 1925; Boone, 1930; A. Milne Edwards & Bouvier, 1923; Gomez &

Ortiz, 1976), between Jamaica and Haiti, Hispaniola (Rathbun, 1925), Puerto Rico (Rathbun, 1901, 1925), Barbados (Rathbun, 1921; Jones, 1969), Montserrat (A. Milne Edwards & Bouvier, 1923), Dominica (Verrill, 1908, Rathbun, 1925), St. Maarten (Wass, 1955), Grenadines (A. Milne Edwards & Bouvier, 1923), Colombia (Schmidt, 1939), and Brazil (Rathbun, 1925; Coêlho, 1969, 1971; Coêlho & Ramos, 1972).

Mithrax holderi Stimpson, 1871
(figs. 5-8)

Mithrax subspinosa Krøyer, MS labels in Copenhagen Museum.

Mithrax holderi Stimpson, 1871: 177; A. Milne Edwards, 1875: 99; Miers, 1886: 86; Rathbun, 1898: 259, pl. 3 fig. 2; Rathbun, 1901: 69; Pearse, 1932b: 121; Abele & Kim, 1986: 524, 525 fig. a.

Mithrax bahamensis Rathbun, 1892: 267, pl. 38 fig. 1.

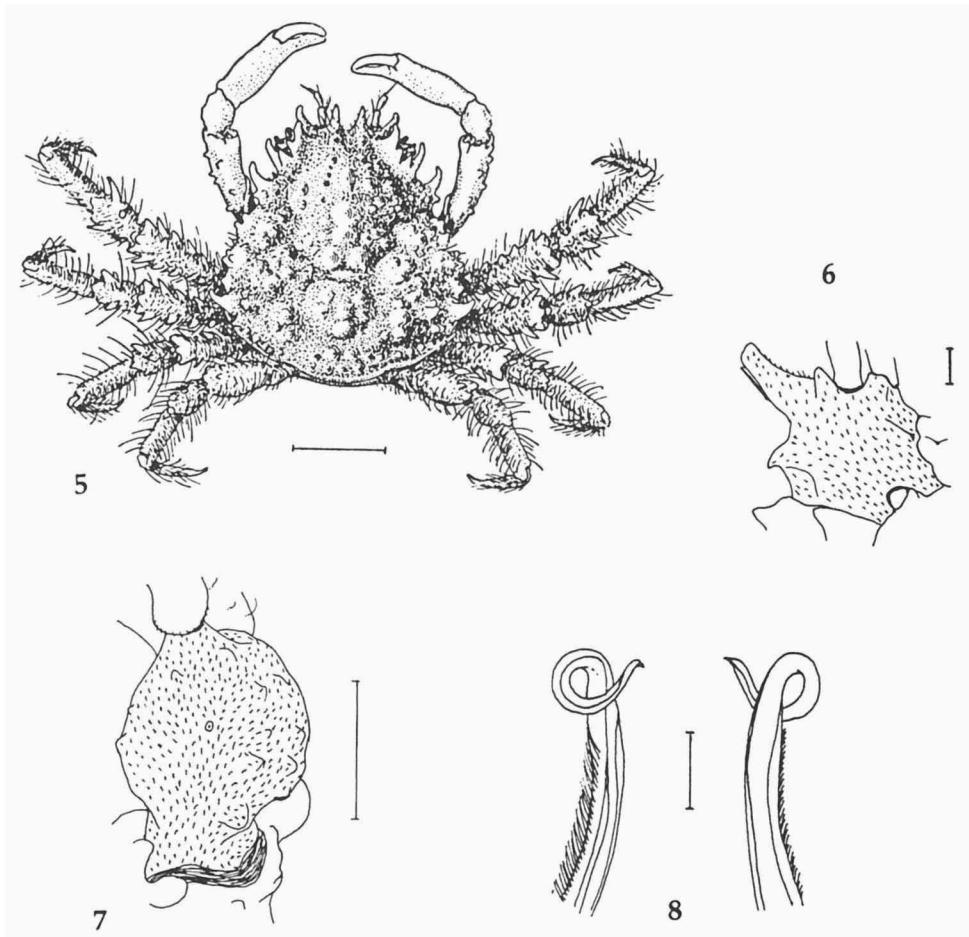
Mithrax acuticornis; Rathbun, 1924: 20 (non Stimpson, 1871).

Mithrax (Mithrax) holderi; Rathbun, 1925: 392, pl. 138 figs. 1-2, pl. 257 fig. 2; Boone, 1930: 97, pl. 97 fig. B; Gomez & Ortiz, 1976: 15; Powers, 1977: 57; Vélez, 1977: 127 fig. 15.

Mithrax (Mithrax) bahamensis; Rathbun, 1925: 393, pl. 137 figs. 1-2, pl. 259 fig. 1; Gomez & Ortiz, 1976: 15.

Material.— U.S.A., Florida.— Tortugas: 1 ovig. ♀ (RMNH D 4917), -vii.1925, leg. H. Boschma.— Virginia Key, NE side: 1 juv. ♂ (RMNH D 37103), sandflat with *Syringodium* and *Thalassia* beds, 0.5-1.5 m., 4.ix.1963, sta. 1408, leg. PWH. Bahamas.— Andros Island: 2 ♂♂, 1 juv. ♀ (USNM 45213), leg. F. Stearns, (lectotype *M. bahamensis* Rathbun (=neotype *M. holderi* Stimpson)) and paralectotypes *M. bahamensis* Rathbun). West Indies.— 1 ♂ (ZMC), leg. Bang. St. John.— 1 ♂, 1 ♀ (ZMC), leg. Ørsted. Anguilla.— Long Pond: 1 juv. ♂ (RMNH D 37102), 0.3-1 m. 9.vii.1983, leg. P. van den Heuvel. Colombia.— Santa Marta: 1 ♂, 1 ovig. ♀ (SMF 9084), 29.xii.1975, leg. M. Vélez. Curaçao.— Playa forti, W point: 1 ♂ (ZMA), under stones, 3 m., 2.xi.1975.— Piscadera Baai, mouth: 1 ♀ (RMNH D 37105), between algae, sponges etc., at night, 0-1 m., 7.i.1957, leg. LBH.— Piscadera Baai, entrance: 3 ♂♂ (1 juv.), 2 ♀♀ (1 ovig.) (RMNH D 37106), sand to muddy sand, in sponges, between algae, sponges, hydroids, tunicates etc., 0-1.5 m., 12.xi-xii.1956, leg. LBH.— Piscadera Baai, Boca Stroink (entrance), E, N of water-pipe: 1 ♂ (RMNH D 37104), muddy bottom, *Rhizophora* with *Didemnum*, *Diplosoma* and other ascidians, 0-0.5 m., 28.xi.1963, sta. 1464, leg. PWH.— Piscadera Baai, Binnenbaai (Padang, Inner Bay), S part, near Carmabi: 1 ♂, 1 juv. ♀ (RMNH D 8423), rock debris and sand with soft, blackish mud, 0.5-1.5 m., 2.ii.1949, sta. 1028A, leg. PWH.— Piscadera Baai, Inner Bay: 1 juv. ♀ (ZMA), on mangrove, 6.x.1958, leg. J. H. Stock.— Between Piscadera Baai and Blue Bay: 1 juv. ♀ (RMNH D 30378), close to the column of *Condylactis gigantea* and also seen to "enbrace" the tentacles, 50 feet (= 15.24 m.), coll. R. M. den Hartog & U. de Windt, don. J. C. den Hartog.— Fuik Baai, W part, Duitse Bad: 1 juv. ♀ (RMNH D 8424), sandy mud with rock debris, few *Thalassia*, *Sargassum*, 1-2 m., 20.xi.1948, sta. 1039A, leg. PWH.— Boca Lagoen, N side: 1 juv. ♀ (RMNH D 8430), rocky beach with small tide pools, 0-0.5 m., 13.xi.1948, sta. 1020A, leg. PWH.— Caracas Baai, 2 juv. ♂♂, 3 juv. ♀♀ (ZMA), from sponge, 10.v.1920, coll. C. J. van der Horst; 1 ♂ (ZMA), from coral, 5 and 13.v.1920, coll. C. J. van der Horst. Bonaire.— Lac, entrance, near E point of Cai: 1 juv. ♂ (RMNH D 8431), sandy reef with much *Acropora*, 1-2 m., 1.x.1948, sta. 1068a, leg. PWH. Klein Bonaire.— E coast at landing: 2 juv. ♂♂ (RMNH D 8429), reef debris on sandy beach, 0-0.5 m., 13.ix.1948, sta. 1049B, leg. PWH. Islate Aves.— Northern lagoon: 1 juv. ♂ (RMNH D 8432), sandy shore with some debris of coral and beach rock, 0-1 m., 12.v.1949, sta. 1114, leg. PWH.

Description.— The carapace is somewhat longer than broad. Its surface is covered regularly with short hairs and with small areolae, each surmounted by one to several tubercles; the four largest tubercles are placed in a curve along the posterior margin and one spine is situated dorsally next to the posterolateral spine. The rostrum is bifid, short and triangular; the tips converging. Basal antennal segment with



Figs. 5-8. *Mithrax holderi* Stimpson, 1871: 5. dorsal view of the animal (after Rathbun, 1898), 10 mm indicated; 6. right basal antennal segment (RMNH D 8423); 7. carpus of the right cheliped (RMNH D 8423); 8. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (USNM 45213); 6-8. 1 mm indicated.

three spines, of which the first, situated near the base of the first movable article, and the third are very small and of about equal size, the second is larger, reaching nearly as far forward as the rostrum. The antennae are almost one third of the carapace length and bordered laterally by long hairs. The orbit is armed with one spine below (not counting the third basal antennal segment), and four spines above. These four spines are formed by one preorbital spine, one postorbital spine, and two smaller spines in between. The carapace has four anterolateral spines and one posterolateral spine; the first anterolateral spine, situated on the hepatic region, is double, the first and the fourth, are larger than the other (two) spines; the second to fourth spine have each a smaller spine in front. The second and third anterolateral spines are of equal size; the posterolateral spine is the smallest. The chelipeds of the males are as long and stout as the first pair of ambulatory legs; the merus has one irregular row of three spines on the upper margin, two tubercles on the lower outer margin and three

on the lower inner margin; the carpus shows a few tubercles arranged longitudinally; the palm is smooth; the fingers have a relatively short and narrow gape; the cutting edges of the fingers are denticulate, and there is a larger denticle on the dactylus at one third of the gape. The first pair of ambulatory legs is about 1.25 times as long as the carapace (including the rostrum). The ambulatory legs are covered with a dense pile of long hairs and flattened above; the lateral edges of the upper surface of the merus and carpus are bordered with long spines, decreasing in size posteriorly. The propodus and dactylus are without spines, but more densely pubescent than the merus and carpus.

The male gonopod is stout and slightly bent, with hairs on the outer edge. It is slightly dorsoventrally flattened, the distal portion is curled to the outer side, the tip pointing inwards. The genital opening of the female is on the outer anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal was an adult ovigerous female of 34.5 mm long (including the rostrum) and 32.0 mm wide (excluding the spines) (RMNH D 37106).

Colour.— The alcohol specimens RMNH D 37105 and 37106 are bright orange with red patches on the carapace. The merus and carpus of both the chelipeds and the ambulatory legs are orange-red, mottled with red; a light orange band is visible halfway the merus. The propodus and dactylus are bright orange; they have white tips in the chelipeds and white and brown tips in the ambulatory legs.

Remarks.— This species can be easily recognized by the quadrangular shape of its carapace. It reminds one of *Mithrax hemphilli* Rathbun, 1892, but can be distinguished by lacking the closely set granules on its upper surface. *M. bahamensis* of which the type material was studied (USNM) is considered here to be conspecific with *M. holderi*. It only has the dense pile fully intact, giving it a less tuberculate appearance than it actually is. The unique curled distal part of the male gonopod also present in the type of *M. bahamensis* is typical for *M. holderi*. The male specimen of *M. bahamensis* photographed in Rathbun (1925, pl. 137), and of which the second gonopod is figured herein (fig. 8) is selected as the lectotype of *M. bahamensis*. As there is no type specimen extant of Stimpson's *Mithrax holderi*, a neotype is selected here. Unfortunately no male specimens from the type-locality of *M. holderi* (Tortugas, Florida) are available and the juvenile male from Viginia Key, Florida is too young to be selected as neotype. Therefore the lectotype specimen of *M. bahamensis* is selected as neotype of *M. holderi*, subsequently making *M. bahamensis* an objective junior synonym of *M. holderi*.

Specimens of *M. holderi* were found together with *Mithraculus cinctimanus* in sponges (Rathbun, 1925; Powers, 1977). Pearse (1932b) reported *M. holderi* inhabiting the sponge *Strematumenia strobilina* (Lamarck).

Distribution.— The species is reported in the literature from the following localities: Florida, U. S. A. (Stimpson, 1871; Rathbun, 1898, 1901, 1925; Boone, 1930; Pearse, 1932b), Gulf of Mexico (Powers, 1977), Bahamas (Rathbun, 1892, 1925), Cuba (Rathbun, 1898, 1925; Boone, 1930; Gomez & Ortiz, 1976), Jamaica (Rathbun, 1925), Puerto Rico (Rathbun, 1901, 1925), St. John (Rathbun, 1898, 1901, 1925), St. Croix (Rathbun, 1898, 1901, 1925), West Indies (Rathbun, 1925), Curaçao (Rathbun, 1924), and Colombia (Vélez, 1977).

Mithrax brasiliensis Rathbun, 1892
 (figs. 9-12)

Mithrax brasiliensis Rathbun, 1892: 268, pl. 36 fig. 2; Rathbun, 1900a: 143; Moreira, 1901: 62.
Mithrax (Mithrax) brasiliensis; Rathbun, 1925: 404, pl. 147 fig. 1, text-fig. 123; Coêlho, 1971: 140; Coêlho & Ramos, 1972: 215.

Material.— **Brazil.**— Pernambuco, Rio Formoso: 1 juv. ♂, 3 juv. ♀♀ (USNM 19953), 1876-77, leg. C. F. Hartt, Hartt Explorations.— Bay of Bahia, Mar Grande: 1 ♂ (USNM 19952, holotype), 1876-77, leg. R. Rathbun, Hartt Explorations.— Alagoas, Maceio coral reef, 1 ♂ (USNM 25757), 22.vii.1899, leg. A. W. Greeley, Branner - Agassiz Exped.— Laje de Santos, São Paulo: 1 juv. ♂ (RMNH D 6772), shell and sandbottom, 30-32 m., 23.iv.1961, leg. L. R. Tommasi.

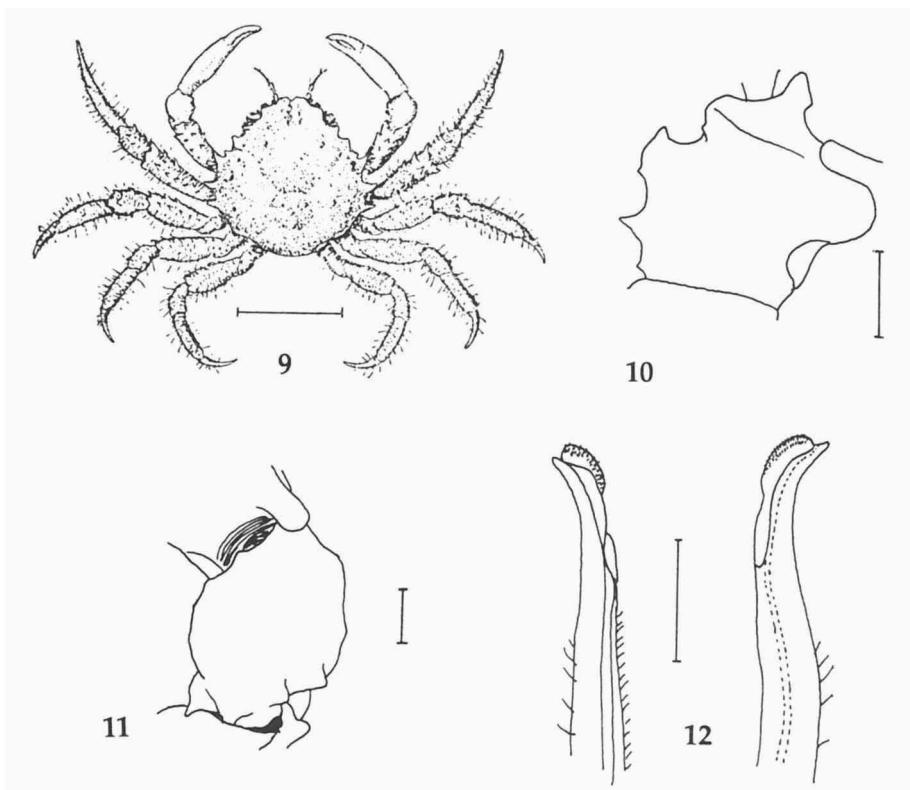
Description.— The carapace is slightly broader than long. Its surface is covered with fine tubercles in the posterior half, and with weakly developed tubercles in the anterior half. The rostrum is bifid, the tips short, very broad and blunt. Length of rostrum up to 0.02 times the length of remainder of the carapace. Basal antennal segment with three or four spines. Of these, the first, situated near the base of the first movable article, is broad; the second is larger (in some specimens with three pointed tips); the third spine is small, and pointed; quite behind the edge an obscure pointed spinule may be present. The antennae are about one sixth of the carapace length and are bordered laterally by hairs. The orbit is armed with two spines below (not counting the third basal antennal spine) of which the first is dentate, and four on the upper orbital margin. The four dorsal spines are formed by one preorbital spine, one postorbital spine, and two smaller spines in between. The carapace has four large anterolateral spines, and one posterolateral spine; the first anterolateral spine, situated on the hepatic region, carries tubercles at its base; the second and third have both a small spine in front. The anterolateral spines increase in size posteriorly, except that the fourth is smaller than the third; the posterolateral spine is the smallest.

The chelipeds of the male are somewhat stouter, but about as long as the first pair of ambulatory legs; the merus is armed with two rows of respectively two and three spines on the inner margin, and a row of eight spines above; the carpus is obscurely tuberculate, three tubercles (one sometimes weakly developed) are present on the upper inner margin and two on the upper outer margin; the upper edge of the palm is unarmed; the fingers have a short and narrow gape, the cutting edges are denticulate; there is a larger denticle on the cutting edge of the dactylus at the end of its basal third. The first pair of ambulatory legs is 1.3 times as long as the carapace (including the rostrum). The merus and carpus of the ambulatory legs have two rows of spines: carrying respectively six and four spines in the merus and one each in the carpus. The propodus and dactylus are without spines, but covered with a dense pile of short hairs, extending distally to the proximal half of the dactylus.

The male gonopod is stout and slightly bent. It is dorsoventrally flattened, the tip is short truncate and pointed to the outside. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal is an adult male of 15.0 mm long (including the rostrum) and 15.8 mm wide (excluding the spines) (USNM 19952 - holotype).

Colour.— All spirit specimens examined were reddish brown.



Figs. 9-12. *Mithrax brasiliensis* Rathbun, 1892: 9. dorsal view of the animal (after Rathbun, 1892), 10 mm indicated (USNM 19952); 10. right basal antennal segment (USNM 19952); 11. carpus of the right cheliped (USNM 19952); 12. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (USNM 19952); 10-12. 1 mm indicated.

Remarks.—The recently described *M. caboverdianus* Türkay, 1986, from the Cape Verde Islands, Eastern Atlantic, seems closest to *M. brasiliensis*, but is different from this species in its gonopod shape and tuberculation of the body (for details see Türkay, 1986).

Distribution.—This species has so far been reported from Brazil only (Rathbun, 1892, 1900a, 1925; Moreira, 1901; Coêlho, 1971; Coêlho & Ramos, 1972).

***Mithrax spinosissimus* (Lamarck, 1818)**
(figs. 13-16)

The lazy Crab; Hughes, 1750: 262, pl. 25 fig. 1.

Maia spinosissima Lamarck, 1818: 241; Lamarck, 1838: 435.

Mithrax spinosissimus; H. Milne Edwards, 1832: 9, pls. 2-3; White, 1847: 6; Gibbes, 1850: 172; Guérin Meneville, 1857: 25; Stimpson, 1860: 188; Desbonne & Schramm, 1867: 4, pl. 8 fig. 24; von Martens, 1872: 81; A. Milne Edwards, 1875: 100; Kingsley, 1880: 390 (part); Miers, 1886: 86; Aurivillius, 1889: 57; Rathbun, 1892: 261; Nutting, 1895: 209; Rathbun, 1897: 9; Rathbun, 1898: 259; Torralbas,

1900: Rathbun, 1901: 66; 14, fig. 7; Rathbun, 1919: 344; Rathbun, 1921: 82; Rathbun, 1933: 29; Jones, 1969: 380; Bonelly de Calventi, 1974: 25; LaTourette, 1974: 99, 125; Hazlett & Rittschoft, 1975: 101-118; Voss, 1976: 118, 119, fig.; Provenzano & Brownell, 1977: 735-752, figs. 1-7; Colin, 1978: 366, 368; Gore, Scotto & Yang, 1982: 525; Valdés-Muñoz, 1986: 11, 15; Abele & Kim, 1986: 522, 523 figs. a-b.

Maja (Mithrax) spinosissima; de Haan, 1837: pl. F; Herklots, 1861: 19.

Mithrax spinosissima; Gundlach, 1887: 117.

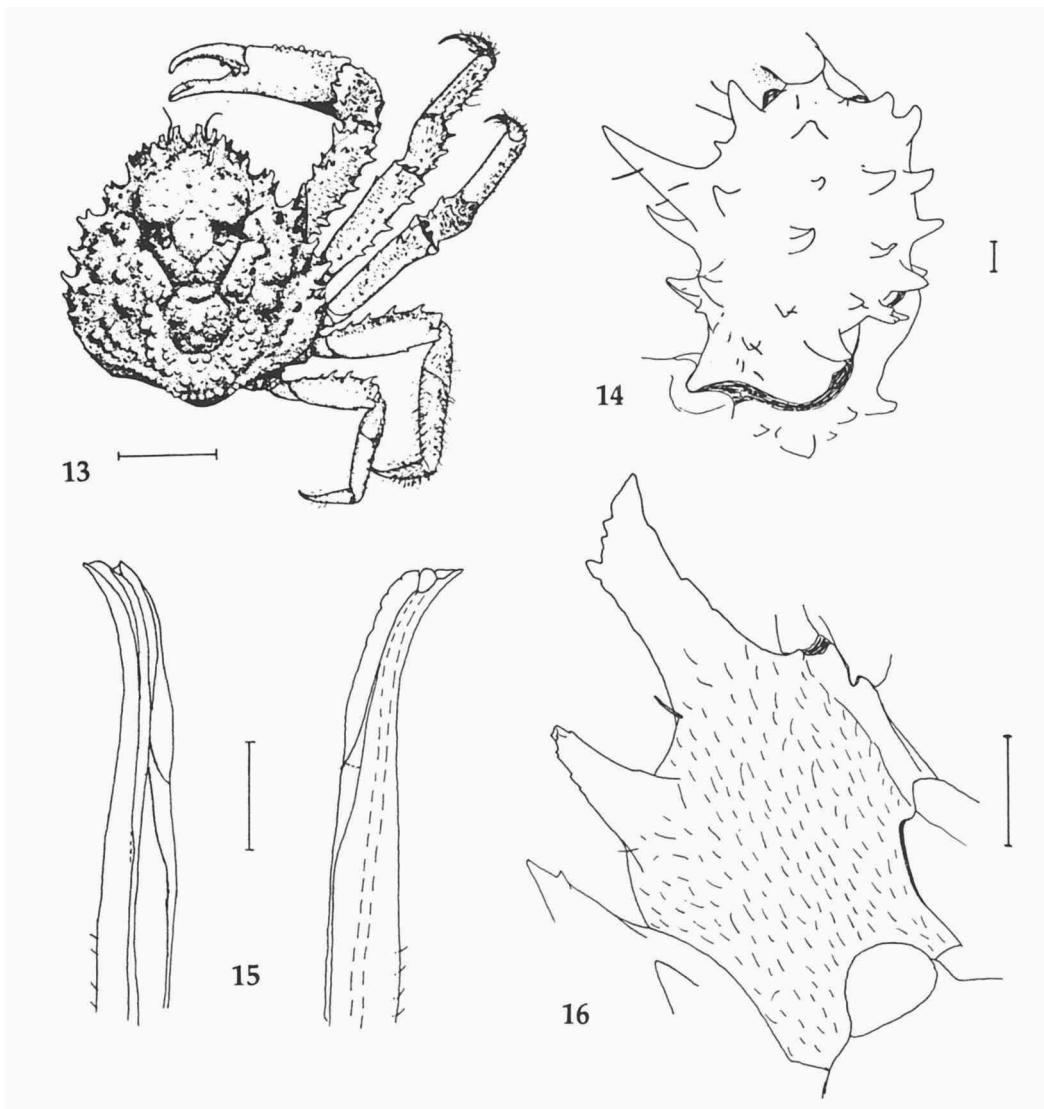
Mithrax hispidus; Doflein, 1899: 179 (not Herbst, 1790).

Mithrax (Mithrax) spinosissimus; Young, 1900: 88; Rathbun, 1925: 383, pl. 135; Chace, 1940: 67; Williams, 1965: 254, figs. 234, 245A; Gomez & Ortiz, 1976: 15; Powers, 1977: 58; Williams, 1984: 335, figs. 270, 275B.

Material.—U.S.A., Florida.—Torugas: 1 juv. ♂, 1 ovig. ♀ (RMNH D 4903), -vi.1925, leg. H. Boschma. Antilles.—1 ♂ (MP B-10778); 2 ♂♂ (1 juv.) (RMNH D 37141), don. Museum Paris. Hispaniola, Dominican Republic.—Prov. Azua, Bay of Puerto Viejo: 4 ♂♂, 3 ♀♀, juveniles, 19.i.1988, H. P. Wagner (pers. obs.). Puerto Rico.—Cabo Rojo, Punta Guaniquilla: 1 ♂ (ZMA), at reef, ca. 3 m., 16.ii.1963, leg. J. H. Stock. St. Thomas.—1 ♂ (ZMA). St. Maarten.—Simsons Baai: 1 juv. ♂ (RMNH D 2313), 1 juv. ♀ (RMNH D 2314), 3.ix.1905, leg. J. Boeke. Guadeloupe.—1 ♂ (MP B-12461), leg. Beauferthuis. Curaçao.—Brakke Put, near Jongensstad, near Spaanse Water: 1 juv. ♀ (RMNH D 37108), sandy bottom with mud and rocks, on rocks, between algae, 31.xii.1956, sta. 1030, leg. LBH.—Piscadera Baai, outer bay: 1 ♂ (RMNH D 21818), by fishermen, 3-5 m., 1.x.1967, don. PWH.—Piscadera Baai, Boca Stroink (entrance), W: 1 juv. ♀ (RMNH D 37109), water-pipe, iron supports in tidal flow, with dense *Pennaria*, *Didemnum*, *Styela* and *Microcosmus*, 0-1 m., 2.i.1964, sta. 1462, leg. PWH.—Caracas Baai: 1 ♂ (RMNH D 10669), 22.iii.- 20.iv.1955, coll. P. J. Scheer, don. J. S. Zaneveld & P. Wagenaar Hummelinck. Bonaire.—1 ♂ (RMNH D 35981), 7.vii.1982, leg. M. v.d. Knaap.—Playa Lechi: 1 carapace (RMNH D 37140), -x.1954, leg. D. Fricke. Honduras.—Off east coast: 1 ovig. ♀ (RMNH D 37107), 13°16'N 82°19'W, 10' ottertrawl, 26 m., 29.i.1971, Pillsbury sta. P-1340. Locality unknown.—1 carapace (RMNH D 37139).

Description.—The carapace is about as broad as long. Its surface is rough with short tubercles, and it is nearly naked. Laterally the tubercles become more and more spine-like. The rostrum is bifid, relatively long, obliquely truncate and granulate. At the base of the two horns of the rostrum there are two stout spines present, and behind these two others but farther apart. Basal antennal segment with three spines of which the first, situated near the base of the first movable article, is so strongly reduced in adults that it seems absent at first sight; the second spine is largest and reaches as far forward as the rostrum, the third is half as long as the second. The antennae are one seventh of the carapace length in large specimens and laterally bordered by a few short hairs. The orbit is armed with one spine below (not counting the third basal antennal spine), one at the outer angle and five above. These five are formed by one preorbital spine, one postorbital spine, and three smaller spines in between. These spines sometimes are bifid at the tip. The carapace has five anterolateral spines and one posterolateral spine; the first two anterolateral spines, of which the first is situated on the hepatic region, are bifid. The last anterolateral spine and the posterolateral spine are smaller than the first four anterolateral spines.

The chelipeds of the male are stouter, and up to 1.5 times longer, than the first pair of ambulatory legs; the merus is armed with numerous spines of which up to ten are on the posterior margin, the others are irregularly disposed; the carpus is covered on the outer side with numerous unequal tubercles or spines, of which about five are on the inner margin; the palm is high, compressed, armed above with an irregular row of up to 11 tubercles or spines and on the inner surface with two to



Figs. 13-16. *Mithrax spinosissimus* (Lamarck, 1818): 13. dorsal view of the animal (after Williams, 1965), 30 mm indicated; 14. carpus of the right cheliped (RMNH D 10669); 15. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 10669); 16. right basal antennal segment (RMNH D 10669); 14-16. 2 mm indicated.

four spines in the proximal half; the fingers are curved, with a wide gape; only the distal half of their cutting edges is denticulate, and there is a larger denticle in the middle of the edge of the dactylus. In the female the chelipeds are as long as the first pair of ambulatory legs. The first pair of ambulatory legs is 1.5 times as long as the carapace (including the rostrum). The ambulatory legs are coarsely hairy and have two or three rows of spines on the upper border of the merus, carpus and propodus, the spines of the most anterior row are largest and all spines increase in size distally.

There are two to four spines on the anterior side of the propodus.

The male gonopod is long and stout. It is dorsoventrally flattened, slightly bent distally and tapers to a rather sharp point. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.—The largest specimen at my disposal is an adult male of ca. 160 mm long (including the rostrum) and ca. 156 mm wide (excluding the spines) (MP B-10778).

Colour.—In literature the colour descriptions give: vinous red with yellowish tints (A. Milne Edwards, 1875), bright carmine (Verrill, 1908), or thorax dark red, ambulatories brick red, chelipeds rose-red with yellow fingers (Doflein, 1899). The colour of one of the dry specimens at my disposal closely resembles the description given by A. Milne Edwards. It has a red carapace, becoming more yellowish near the grooves on the upper surface; the legs are yellowish with red spines and dots above and anteriorly; the tips of the dactylus are dark brown, the hairs reddish brown and the chelipeds cream to pinkish red above.

Remarks.—In juvenile and medium sized specimens the carapace is slightly to distinctly longer than wide. The very juvenile specimens have a more or less quadrangular shape. The gape of the fingers is, naturally, more reduced in smaller specimens than in the larger specimens. The presence of tubercles on the inner surface on the proximal half of the palm (in adults) and the less hairy surface of the carapace, make this species easily recognizable from any other *Mithrax* species. This is the largest species in the genus.

Distribution.—This species has previously been reported in the literature from: Mauritius (Lamarck, 1818, 1838 (wrong locality!)), U.S.A., North and South Carolina (Rathbun, 1925), U.S.A., Florida (Gibbes, 1850; Stimpson, 1860; Kingsley, 1880; Rathbun, 1892, 1901, 1925), Gulf of Mexico (Powers, 1977), Bahamas (Rathbun, 1898, 1901; Nutting, 1895; Hazlett & Rittschoft, 1975; Colin, 1978), West Indies (White, 1847; Rathbun, 1901), Cuba (von Martens, 1872; Gundlach, 1887; Rathbun, 1892, 1925; Torralbas, 1900; Chace, 1940; Gomez & Ortiz, 1976), Jamaica (Rathbun, 1897, 1925), Hispaniola, Haiti (Rathbun, 1925), Hispaniola, Dominican Republic (Bonelly de Calventi, 1974), Puerto Rico (Gundlach, 1887; Rathbun, 1901), St. Thomas (Rathbun, 1925), Barbados (Hughes, 1750; Jones, 1969), St. Maarten (Rathbun, 1919, 1925), Martinique (H. Milne Edwards, 1832), St. Barts (Aurivillius, 1889), Guadeloupe (Desbonne & Schramm, 1867; Rathbun, 1892, 1925), and Venezuela (Provenzano & Brownell, 1977).

Mithrax hispidus (Herbst, 1790)
(figs. 17-23)

Cancer hispidus Herbst, 1790: 247, pl. 18 fig. 100.

Maia spinicincta Lamarck, 1818: 241; Say, 1818: 458; Lamarck, 1838: 434.

Mithrax hispidus; Latreille, 1818: 224; Desmarest, 1823: 264; H. Milne Edwards, 1832: 11; White, 1847: 6; Gibbes, 1850: 172; de Saussure, 1858: 423; de Saussure, 1858a: 7; Stimpson, 1860: 188; Desbonne & Schramm, 1867: 7; Smith, 1869: 2; von Martens, 1872: 82; A. Milne Edwards, 1875: 93; A. Milne Edwards, 1878: pl. 21 fig. 1; Miers, 1879: pl. 13 figs. 7-8; Kingsley, 1880: 390; Miers, 1886: 86; Gundlach, 1887: 118; Benedict, 1892: 77; Rathbun, 1892: 265; Nutting, 1895: 123; Rathbun, 1897: 10; Rathbun, 1898: 259; Rathbun, 1898a: 579; Rankin, 1900: 532; Rathbun, 1900: 511; Torralbas, 1900:

17; Moreira, 1901: 62; Rathbun, 1901: 67; Verrill, 1908: 404, fig. 40, pl. 23 figs. 3-4, pl. 25 fig. 1; Rathbun, 1924: 20; Pearse, 1932: 109; Rathbun, 1933: 30; Jones, 1969: 381; LaTourette, 1974: 99, 125; Pequegnat & Ray, 1974: 236, figs. 5-10; Ray, 1974: 271, figs. 259-260; Rodriguez, 1980: 287; Abele & Kim, 1986: 524, 525 figs. e-f.

Mithrax spinicinctus; Desmarest, 1823: 264; Desmarest, 1825: 150, pl. 23 fig. 1; White, 1847: 6.

Maja (Mithrax) hispidus; de Haan, 1837: pl. F.

Maja (Mithrax) verrucosa; Herklots, 1861: 19 (not H. Milne Edwards, 1832).

Mithrax laevimanus Desbonne & Schramm, 1867: 7, pl. 1 figs. 1-2; A. Milne Edwards, 1875: 94; A. Milne Edwards, 1878: pl. 21 fig. 2; Miers, 1886: 86; Rathbun, 1901: 67.

Mithrax.....; Desbonne & Schramm, 1867: 8, pl. 2 figs. 4-5; von Martens, 1872: 82.

Mithrax pleuracanthus Stimpson, 1871: 116; A. Milne Edwards, 1875: 95, pl. 20 fig. 3; Kingsley, 1880: 390; A. Milne Edwards, 1880: 2; Aurivillius, 1889: 58; Rathbun, 1900: 511; Rathbun, 1901: 68; Hay & Shore, 1918: 458; Rathbun, 1921: 83; A. Milne Edwards & Bouvier, 1923: 391; Rathbun, 1924: 20; Pearse, 1932b: 121; Rathbun, 1933: 31; Wass, 1955: 168; Menzel, 1956: 45; Jones, 1969: 382; Rodriguez, 1980: 287; Gore, Scotto & Yang, 1982: 525; Valdés-Muñoz, 1986: 11; Abele & Kim, 1986, 526, 527 figs. c-d.

Mithrax depressus A. Milne Edwards, 1875: 96; Miers, 1886: 86; Verrill, 1900: 577; Rathbun, 1901: 68; Verrill, 1908: 407, pl. 23 figs. 1(?)-2; Hay & Shore, 1918: 458; Rathbun, 1919: 344; Rathbun, 1921: 83.

Mithrax hispidus var. *pleuracanthus*; Miers, 1886: 88.

Mithrax (Mithrax) depressus; Young, 1900: 91.

Mithrax (Mithrax) laevimanus; Young, 1900: 92; Rathbun, 1925: 419, pl. 261.

Mithrax (Mithrax) hispidus; Young, 1900: 90; Rathbun, 1925: 406, pls. 145-146, 147 fig. 3, text-fig. 124; Boone, 1927: 38; Boone, 1930: 89, pl. 27; Lemos de Castro, 1962: 38, pl. 1 fig. 6; Williams, 1965: 256, figs. 236, 245C; Coêlho, 1969: 237; Coêlho, 1971: 140; Coêlho & Ramos, 1972: 215; Gomez & Ortiz, 1976: 15; Powers, 1977: 56; Garth, 1958: 330; Williams, 1984: 333, figs. 268, 275D.

Mithrax (Mithrax) pleuracanthus; Young, 1900: 92; Rathbun, 1925: 411, pl. 150; Boone, 1927: 39; Boone, 1930: 92, pl. 28 fig. A; Chace, 1956: 161; Chace, 1956a: 21; Bullis & Thompson, 1965: 12; Williams, 1965: 257, figs. 237, 245D; Gomez & Ortiz, 1976: 15; Powers, 1977: 57; Garth, 1978: 330; Goy, Bookhout & Costlow, Jr., 1981: 51; Williams, 1984: 334, figs. 269, 275E.

Mithrax caribbaeus Rathbun, 1920: 23; Rathbun, 1921: 83, pl. 3; Rathbun, 1924: 20; Holthuis, 1959: 190; Jones, 1969: 381; Rodriguez, 1980: 287; Valdés-Muñoz, 1986: 10; Abele & Kim, 1986: 527, fig. b.

Mithrax tortugae Rathbun, 1920: 23; Rathbun, 1924: 20; Rodriguez, 1980: 288; Abele & Kim, 1986: 526, 527, fig. a.

Mithrax (Mithrax) caribbaeus; Rathbun, 1925: 409, pls. 148-149; Guinot-Dumortier, 1960: 181, figs. 24-25; Bullis & Thompson, 1965: 12; Coêlho, 1971: 140; Coêlho & Ramos, 1972: 215; Bonelly de Calventi, 1974: 25; Gomez & Ortiz, 1976: 15; Vélez, 1977: 127, fig. 17.

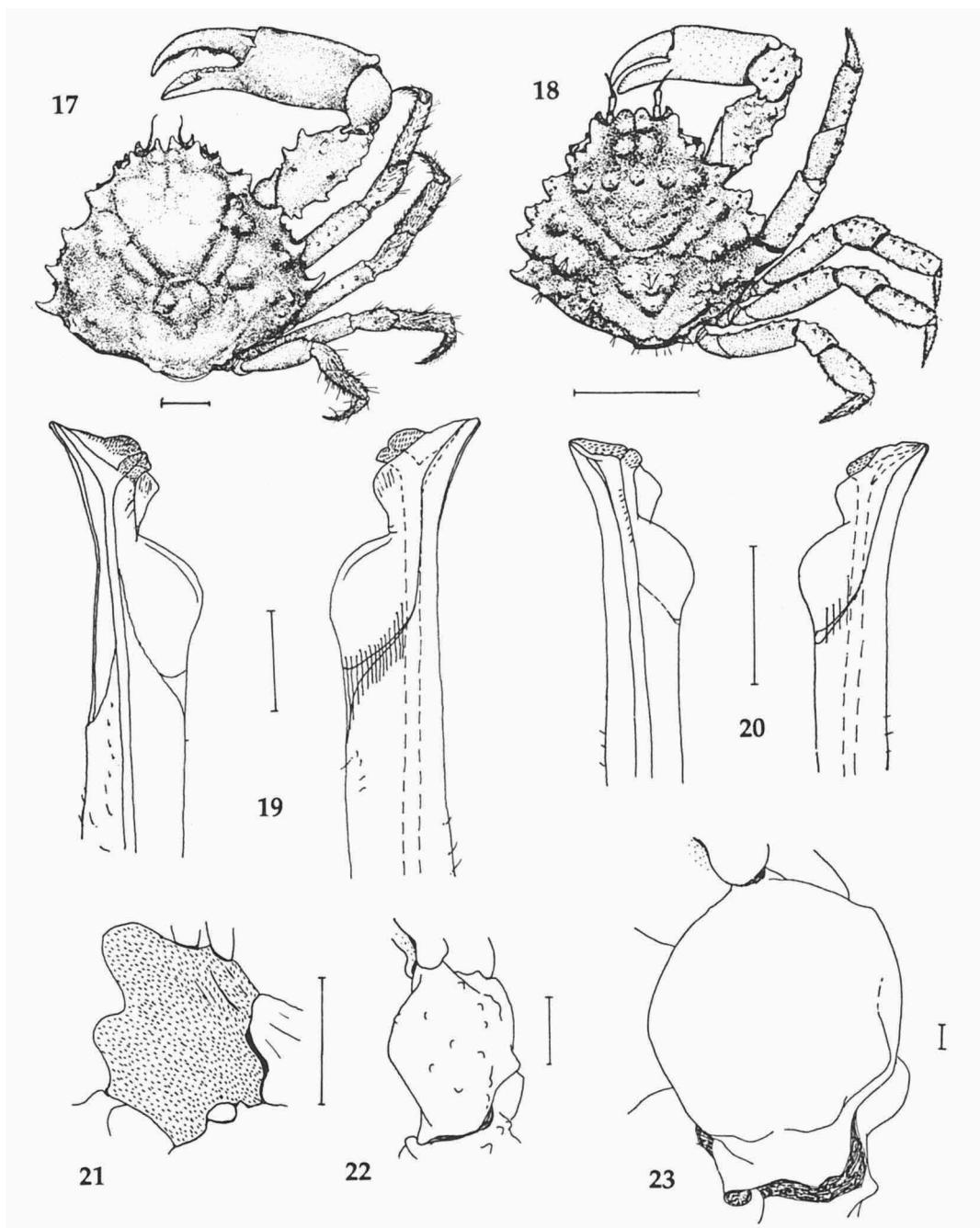
Mithrax (Mithrax) tortugae; Rathbun, 1925: 417, pl. 147 fig. 2; Gomez & Ortiz, 1976: 15; Vélez, 1977: 130, fig. 18.

Material.— U.S.A., Florida.— Tortugas: 1 juv. ♀ (USNM 50442, holotype *M. tortugae* Rathbun), leg. W. H. Longley.— E coast, S of Fort Worth, Boynton Beach: 1 carapace (RMNH D 37146), washed ashore, sandy beach with *Phragmentopoma* and rocks in front, 22.vi.1970, leg. LBH.— Near Miami, N point Key Biscayne: 1 carapace (RMNH D 37070), 16.viii.1968, leg. LBH.— Key Biscayne, Bear Cut: 1 juv. ♂, 1 juv. ♀ (RMNH D 37131), 10.i.1965, leg. LBH; 1 juv. ♀ (RMNH D 37132), 1 juv. ♂, 3 juv. ♀♀ (RMNH D 37070), 7.ii.1965, leg. LBH; 6 juv. ♂♂, 3 ♀♀ (2 juv.) (RMNH D 37072), 12.viii.1966, leg. LBH; 2 ♂♂, 1 ovig. ♀ (RMNH D 37073), 0-1 m, 6.iii.1974, leg. LBH & R. Work; 1 juv. ♀ (RMNH D 37078), 1-10.i.1965, leg. LBH; 1 juv. ♂, 1 juv. ♀ (RMNH D 37093), 10.i.1965, leg. LBH; 1 juv. ♀ (RMNH D 37094), 9-20.xii.1964, leg. LBH; 1 juv. ♂ (RMNH D 37095), serpulids and seagrass, 0-1 m, 3.viii.1966, leg. LBH; 2 ♂♂, 2 ♀♀ (1 ovig.) (RMNH D 37098), seagrass and sponges, 0-1 m, 5.vii.1966, leg. LBH; 1 ♂, 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 37099), 5.vii.1968, leg. LBH; 1 ♂, 1 ovig. ♀ (RMNH D 37100), between seagrass and algae, 0-1 m, 1-9.ix.1963, leg. LBH; 1 ♂, 2 ♀♀ (1 juv.) (RMNH D 37101), under rocks, 0-1 m, 7.vi.1967, leg. LBH.— N point Virginia Key: 1 juv. ♂ (RMNH D 37077), washed ashore on seaweed, 31.viii.1963, leg. LBH.— Norris Cut: 4 juv. ♂♂, 5 juv. ♀♀ (RMNH D 27380), 0-0.5 m., 12.i.1971, leg. LBH. West Indies.— 1 ♂ (RMNH D 2324), leg. J. Boeke; 3 juv. ♀♀ (RMNH D 37071), leg. PWH; 5 ♂♂ (2 juv.), 1 juv. ♀ (ZMC). Antilles.— 1 ♂ (MP B-4122), leg. Plée; 1 ♂ (MP B-19454); 1 ♂ (RMNH D 37148),

don. MP. Jamaica.— Montego Bay: 1 juv. ♀ (SMF 9094), 1904, leg. A. Reichardt. Hispaniola, Dominican Republic.— Prov. Azua, Bay of Puerto Viejo: 1 juv. ♂, on *Mithrax* -cage, among algae, 0-1.5 m., 19.i.1988, sta. 8809, H. P. Wagner (pers. obs.). St. Thomas.— 4 ♂♂ (3 juv.), 5 ♀♀ (2 juv.) (ZMC), leg. Riise.— Harbour: 1 ♂ (USNM 50363, holotype *M. caribbaeus* Rathbun), from piles near town, 7.vii.1915, leg. C. R. Shoemaker. St. Maarten.— Simpson's Bay: 2 ♂♂ (RMNH D 11924), collected by fishermen in canisters, ca. 6 m, 18 and 23.ii.1957, sta. 1114, leg. LBH.— Oyster Pond: 1 ♂ (RMNH D 12204), sandy bottom with seaweeds, in between mangroves, 22.ii.1957, sta. 1123, leg. LBH.— Great Bay (seine): 1 ♀ (RMNH D 37136), 23.vi.1955, leg. PWH.— 1 juv. ♂, 1 juv. ♀ (ZMA), sandy bottom, 1.ix.1905, coll. J. Boeke. Guadeloupe.— 1 juv. ♀ (MP B-477); 1 ♀ (MP B-470), leg. Holissier; 2 ♂♂ (MP B-480), leg. A. Milne Edwards; 1 ♂ (MP B-3976); 1 ♂ (MP B-4555), leg. A. Milne Edwards; 1 ♂ (MP B-4556), leg. A. Milne Edwards; 1 juv. ♀ (MP B-4559), leg. Plée; 2 ♀♀ (MP B-18821, lectotype and paratype of *M. laevimanus* Desbonne in Desbonne & Schramm), collection I. Desbonne; 1 ♂ (MP B-19451, holotype *M. depressus* A. Milne Edwards), leg. Plée; 1 ♂ (MP B-19452), leg. Holissier. Martinique.— 1 juv. ♀ (MP B-476); 1 ♀ (MP B-481). Gulf of Panama.— 1 juv. ♀ (RMNH D 37097), 21°10'N 86°29'W, 10' ottertrawl, 27 m, 23.v.1967, Pillsbury sta. P-583. Colombia.— Gulf of Uraba to San Blas point: 1 ♂ (RMNH D 37068), 8°38.9'N 77°13.2'W, 40' ottertrawl, 55-60 m., 18.vii.1966, Pillsbury sta. P-412.— Dept. Magdalena, vicinity of Santa Marta: 2 juv. ♂♂ (SMF 7560), leg. B. Werding; 1 ♂ (SMF 7356), leg. Margarita; 1 juv. ♂ (SMF 7357), leg. M. Vélez; 2 ♂♂ (1 juv.), 1 juv. ♀ (SMF 7566), leg. B. Werding.— Morrito de Santa Marta: 1 juv. ♂ (SMF), coralslabs, 30 m., 18.ii.1986, leg. HGM.— Santa Marta, harbourmouth: 1 juv. ♀ (SMF 12432), from *Tedania ignus*, 1-2 m., leg. B. Werding.— Punta de Betin, jetty opposite Institute: 1 juv. ♂ (SMF 9949), on fungi and other growth, 12.xii.1978, leg. H. & M. Türkay.— Bahia de Taganga: 18 juv. ♂♂, 10 juv. ♀♀ (ZMA), 5-15 m., 29.ii.1896, yacht "Chazalie"; 1 ♂ (ZMA), in littoral, 8.ii.1896, yacht "Chazalie".— Rio Hacha (Goajira): 1 juv. ♀ (ZMA), 6 m., 2.iii.1896, yacht "Chazalie".— Tayrona Parc, Bahia de Gárraca: 2 juv. ♂♂, 4 ♀♀ (2 juv., 2 ovig.) (ZMA), 0-15 m., -ii.1896, yacht "Chazalie"; 1 juv. ♀ (SMF), *Thalassia*, 1-2 m., 4.x.1985, leg. HGM.— Ensenada de Nenguangue: 1 juv. ♀ (SMF 9941), from corals, ca. 2 m., 15.x.1978, leg. B. Werding. Aruba.— NW coast, Malmok, S of W point: 1 juv. ♀ (RMNH D 14775), on starfish, 5 fathoms (= 9.14 m.), 28.iii.1958, leg. P. A. van den Heuvel. Curaçao.— 1 ♂, 1 carapace (RMNH D 37147), coll. Dr Epp; 1 ♂, 1 ovig. ♀ (RMNH D 1376), 1880, coll. A. J. van Koolwijk; 1 ovig. ♀ (RMNH D 2213), 4.ix.1905, coll. J. Boeke.— Santa Martha: 2 juv. ♂♂, 1 ovig. ♀ (RMNH D 37069), 1-4 m., 4.viii.1954.— Knip Baai, S side: 1 juv. ♀ (RMNH D 8420), perpendicular conglomeratic cliff, 0-1.5 m, 8.i.1949, sta. 1017, leg. PWH.— Piscadera Baai: 1 juv. ♂ (ZMA), ca. 2 m, 11.i.1974, leg. J. H. Stock.— Piscadera Baai, mouth, near Carmabi: 1 juv. ♂ (RMNH D 37134), 4-5.i.1957, sta. 1040, leg. LBH.— Piscadera Baai, entrance: 2 juv. ♂♂, 2 juv. ♀♀ (RMNH D 37081), between algae, sponges, hydroids, tunicates, etc., sand to muddy sand, 12.xi-xii.1956, sta. 1002, leg. LBH.— Piscadera Baai, outer bay: 1 ♂, 1 ♀ (RMNH D 11922), from canisters of fishermen, -ii.1957, sta. 1150, leg. LBH; 1 juv. ♂ (RMNH D 37092), in stone, -ii.1957, sta. 1153, leg. LBH.— Piscadera Baai, Boca Piscadera (outer bay): 1 juv. ♀ (RMNH D 8338), on fence and poles of swimming pool, 0-1 m., 29.i.1949, sta. 1029A, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NE part: 1 ♂, 1 juv. ♀ (RMNH D 37130), sand, 3.5 m., 29.xi.1960, sta. 1453a, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), W side, N of water-pipe: 1 ♂, 1 juv. ♀ (RMNH D 37082), some beachrock with muddy sand, *Rhizophora* with dense *Didemnum*, *Styela* and *Microcosmus*, some *Thalassia*, 0-1 m., 14.xii.1963, sta. 1463A, leg. PWH; 1 juv. ♂ (RMNH D 37084), sandy bottom with *Halimeda*, scanty *Thalassia*, 1 m., 14.xii.1963, sta. 1463A, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), E, N of water-pipe: 1 juv. ♂, 1 juv. ♀ (RMNH D 37083), 2 ♀♀ (1 ovig.) (RMNH D 23408), muddy bottom, *Rhizophora* with *Didemnum*, *Diplosoma* and other ascidians, 0-0.5 m., 28.xi.1963, sta. 1464, leg. PWH.— Piscadera Baai, Binnenbaai (Pading, inner bay), W side, Candelchi: 1 juv. ♀ (RMNH D 37087), scanty on rocky shore, many oysters with *Microcosmus*, *Styela* and *Didemnum*, 0-1 m., 13.xii.1963, sta. 1469, leg. PWH; 1 juv. ♂ (RMNH D 37085), rocky or sandy bottom with some mud, 1-1.5 m., 18.xii.1963, sta. 1469A, leg. PWH.— Piscadera Baai, Binnenbaai (Padding, inner bay), central part at 4th bouy: 1 ♂ (RMNH D 23399), buoy overgrown by oysters and *Didemnum*, *Styela*, etc., 0-0.75 m., 31.x.1963, sta. 1471, leg. PWH.— Piscadera Baai, Binnenbaai, Central part, SW Punta Chumbu: 1 juv. ♂ (RMNH D 37088), *Rhizophora* on rocky shore, many oysters, *Styela* and *Microcosmus*, 0-1 m., 13.xii.1963, sta. 1473, leg. PWH; 4 juv. ♀♀ (RMNH D 37079), *Rhizophora*, 0-1 m., 26.vii.1973, sta. 1473b, leg. PWH.— Piscadera Baai, Binnenbaai, Northern part, SW, Baai Vers, near dam di Raphael: 1 juv. ♀ (RMNH D 37086), *Rhizophora*, 0-1 m., 25.vii.1973, sta. 1487b, leg. PWH.— Spaanse Water, near Jongensstad, Brakke Put: 2 juv. ♀♀ (RMNH 37133), sandy bottom with mud and rocks, in and on rocks, between algae, etc., 0-1 m., 31.xii.1956, sta. 1030, leg. LBH.— Spaanse Water, inner bay, (?) Brakke Put: 1 ♂, 1 juv. ♀ (RMNH D 37075), rock debris, *Thalassia*, mus-

sels, 19.i.1955, sta. 1340, coll. J. S. Zaneveld, don. PWH.— Spaanse Water, near jetty: 1 ♂ (RMNH D 37074), bottom with much seagrass, -xi.1954, leg. J. S. Zaneveld.— Spaanse Water, mouth, near Nieuwpoort: 1 juv. ♀ (RMNH D 37091), between algae, etc., 25.xi.1956, sta. 1013, leg. LBH.— Fuik Baai, W part, Duitse Bad: 1 juv. ♀ (RMNH D 8418), *Rhizophora* with *Isognomon*, 0-1 m., 17.iv.1949, sta. 1038Aa, leg. PWH.— Spaans Lagoen, Santa Barbara Beach, S side: 1 ♀ (RMNH D 8417), sandy beach with a few *Rhizophora* with *Isognomon* and balanids, single *Cassiopea*, 0-1.5 m., 21.iv.1949, sta. 1037A, leg. PWH.— Spaanse Water, near Santa Barbera Beach: 1 juv. ♂ (RMNH D 37135), in sponge, sand and mangroves, 0-1 m., 18.i.1957, sta. 1054, leg. LBH.— Spaanse Water, inner bay, Jan Sofat islet: 1 juv. ♂, 2 juv. ♀ (RMNH D 37137), rocky with *Rhizophora* in mud, 0-1 m., 17.xi.1968, sta. 1629, leg. PWH.— St. Jorisbaai: 2 juv. ♀ (RMNH D 2264), rocky bottom, dredge, 1 fathom (= 1.83 m.), 3.iv.1905, coll. J. Boeke.— Caracas Baai: 1 juv. ♀ (ZMA), 19.iv.1920, leg. C.J. van der Horst; 1 juv. ♀ (ZMA), from coral, 2.iv.1920, leg. C.J. van der Horst; 1 juv. ♀ (ZMA), from sponge, 10.v.1920, leg. C.J. van der Horst; 1 ♂ (ZMA), from sponge, 3.v.1920, leg. C.J. van der Horst. **Bonaire**.— Lac, N, at edge of mangrove-wood: 1 juv. ♀ (ZMA), 12.x.1930, leg. PWH.— Lac, entrance: 1 ♂, 1 juv. ♀ (ZMA), 5.x.1930, leg. PWH.— Lac, entrance, near E point of Cai: 1 ovig. ♀ (RMNH D 7861), 1 juv. ♀ (RMNH D 8421), sand-flat with *Thalassia*, 1.5-2 m., 17.xi.1940, sta. 1067, leg. PWH.— Lac, entrance, Boca behind reef: 1 juv. ♂ (RMNH D 8419), sandy reef with much *Acropora*, 1-2 m., 1.x.1948, sta. 1068a, leg. PWH.— Lac, S part of bassin, Sorobon (Soerebon): 1 ♂ (ZMA), 26.x.1930, sta. 1062, leg. PWH; 1 juv. ♂ (RMNH D 37080), *Rhizophora*, scanty *Thalassia* on sandy mud, 0-1.25 m., 17.iv.1955, sta. 1062a, leg. PWH.— Lac, lagoon and mangroves: 2 ♀ (1 juv.) (RMNH D 12206), between algae, sta. 1138, 6.iii.1957, leg. LBH.— Lagoen: 3 ♂♂ (2 juv.) (ZMA), sand, on roots of mangrove, leg. PWH.— Lagoen, S shore: 3 juv. ♀ (RMNH D 37090), sheet of water in *Avicennia* grove, *Uca*, 0-0.25 m., 19.ix.1967, sta. 1555, leg. PWH.— Boca Onima: 1 juv. ♂, 1 juv. ♀ (RMNH D 37089), on *Sargassum* and other algae cast ashore, 19.v.1930, sta. 1071Ba, leg. PWH. **Klein Bonaire**.— 1 ♂ (ZMA), in coral reefs, -vii.1905, coll. J. Boeke. **Venezuela**.— Los Testigos: 1 juv. ♂ (ZMA), 40 m., 20.i.1896, yacht "Chazalie". **Tobago**.— 1 juv. ♂ (ZMC), -iv. and 1.xii.1916, leg. Th. Mortensen. **French Guyana**.— 1 ♂ (MP B-19450), 30 m., sta. 87, 18.vi.1954. **Surinam**.— Corantijn river, E of mouth: 1 ♂ (RMNH D 25585), 6°38.8'N 56°43.8'W, sand with mud and shellgravel, Agassiz trawl, 38 m., 10.v.1966, "Snellius" O.C.P.S. sta. G 54.— Corantijn river, mouth: 1 juv. ♀ (RMNH D 25917), 7°25.4'N 56°54.4'W, coarse sand with mud and shellgravel, Agassiz trawl, 66-69 m., 11.v.1966, "Snellius" O.C.P.S. sta. H 58.— Between mouth of Corantijn and Coppename river: 1 ♂ (RMNH D 25916), 6°17.1'N 56°18.8'W, clay with sand and shellgravel, Agassiz trawl, 35 m., 12.v.1966, "Snellius" O.C.P.S. sta. E 61.— 20 miles N of the coast, between the mouths of the Nickerie and Coppename river: 1 ♂ (RMNH D 12207), 15 fathoms (27.43 m.), 15-20.iv.1957, third voyage "Coquette".— NNW of "Suriname river" lightvessel: 1 juv. ♀ (RMNH D 12205), 7°2'N 55°40'W, 55 m., 8.viii.1957, third voyage "Coquette". **Brazil**.— Off NE coast: 1 ♂ (RMNH D 22466), 2°37'S 41°3'W, 40' shrimp trawl, 16 fathoms (=29.26 m.), 12.iii.1963, Oregon sta. 4246, don. Institute of Marine Science Miami.— São Paulo, Ilha dos Alcatrazes: 1 juv. ♀ (RMNH D 37096), 36-38 m., 10.viii.1961, leg. L. R. Tommasi.

Description.— The carapace is broader than long (except in young specimens which can be somewhat longer than broad). Its surface is nearly naked and covered with more or less blunt tubercles of which six form two parallel, transverse rows of three tubercles or spines on the protogastric region. The rostrum is bifid, short and somewhat truncate. At the base of the two rostral horns there are two tubercles and behind these two other but farther apart. Basal antennal segment with two spines, of which the first is largest and reaches at least as far forward as the rostrum, the second is one third to half the length of the first. The antennae are up to a quarter of the carapace length and laterally bordered by hairs. The orbit is armed with one spine below (not counting the second basal antennal spine), one at the outer angle and four above. These four spines consist of one preorbital spine, one postorbital spine, and two smaller spines in between. The carapace has four anterolateral spines and one posterolateral spine, the latter being the outermost unit of the posterior transverse row of tubercles; the first two anterolateral spines, of which the anterior is situated on the hepatic region, and sometimes the third, are bifid or trifid; the fourth has a



Figs. 17-23. *Mithrax hispidus* (Herbst, 1790): 17-18. dorsal view of the animals of the *hispidus*-form (17) and the *pleuracanthus*-form (18) (both after Williams, 1965), 10 mm indicated; 19-20. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view of a large individual of the *hispidus*-form (19) (RMNH D 11924) and of a (much smaller) individual of the *pleuracanthus*-form (20) (RMNH D 37138), 1 mm indicated; 21. right basal antennal segment (RMNH D 37138); 22-23. carpus of the right cheliped of young individual (22) (RMNH D 11922) and fully adult individual (23) (RMNH D 37138); 21-23. 2 mm indicated.

small spine in front. The first anterolateral spine is smaller than the second. From the second anterolateral to the posterolateral spine the spines decrease in size.

The chelipeds of the male are much stouter and more than 1.3 times as long as the first pair of ambulatory legs; the merus is armed with four to five tubercles on the posterior margin, two large conical tubercles (separated or fused) on the anterior margin and four or five on the upper surface; the carpus is tuberculate, sometimes obscurely so; the palm is unarmed; the fingers have a relatively short narrow gape; the cutting edges are denticulate, and there is a large broad denticle on the dactylus; this denticle shows three lobes and is placed halfway the gape. The first pair of ambulatory legs is 1.25 to 1.5 times as long as the carapace (including the rostrum). The ambulatory legs are scarcely hairy on the merus and carpus compared to the propodus and dactylus where the pubescence is quite dense. There are two rows of spines on the upper border of the merus and carpus, and an irregular row of spines on the propodus.

The male gonopod is long, stout and slightly bent with short hairs on the lateral borders of its proximal half. It is dorsoventrally flattened and after an incision near the tip, split in two lobes. The caudal lobe has minute grooves in a regular pattern. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal is an adult male of 63.0 mm long (including the rostrum) and 67.0 mm wide (excluding the spines) (USNM 50363).

Colour.— The alcohol specimens vary from cream to yellow. In juveniles two reddish to purple L-shaped spots are visible on the dorsum behind the rostrum. The chelipeds have white tips. The ambulatory legs show reddish bands, their dactyli have a brown tip. The specimens from Surinam still have a dark violet or red blotch on the inside of the carpus of their chelipeds and between the two spines on the anterior side of the merus.

Remarks.— Formerly several species were recognized based on the length-width ratio of the carapace and the intensity of the tuberculation of the bodyparts only. The for this group really significant characters were not known or neglected by previous authors. This highly variable species is represented by rough (*M. pleuracanthus*) and smooth (*M. tortugae*) forms within the same population. Intermediates are formed by the so-called *M. caribbaeus* (slightly tuberculate) and true *M. hispidus* (rather smooth), which can be found also sympatrically with the former forms. In all these "species" the male second gonopod has the same morphology, with characteristic minute grooves on the distal half; these grooves increase in number with the increase of size of this organ. Also *M. pleuracanthus*-forms are found with obscurely tuberculate legs and *M. hispidus*-forms with extreme tuberculate legs. Also the length-width variation of the carapace can vary considerably within the same population. It is interesting that Rathbun identified four specimens from the same locality (Curaçao, Piscadera Baai, leg. C.J. van der Horst, ZMA) as belonging to four distinct species (*M. hispidus*, *M. pleuracanthus*, *M. caribbeaeus* and *M. tortugae*). Her conclusions were based in this matter on a male with 23.5 mm carapace length, which she identified as *M. hispidus*, and three females (all juvenile) of 6.0, 11.0 and 11.7 mm carapace length respectively which she assigned to the other three species. None of the other species of *Mithrax* dealt with in this study has the minute grooves on the distal half of the

gonopod; their presence is an excellent character to distinguish the present species.

The type material of *M. laevimanus* Desbonne in Desbonne & Schramm, 1867, consist of two syntypes, of which one is typically *M. hispidus*, and the other one has a blunt spine on the inner edge of the carpus of the cheliped, as more often found in the more tuberculate specimens of *M. hispidus*. The first of these syntypes is designated as lectotype; carapace length 40.4 mm (incl. rostrum) and 42.9 mm width (excl. spines). *M. laevimanus* unquestionable is a junior synonym of *M. hispidus*.

Adult specimens of 20 mm carapace length from Brazil were examined; specimens from the West Indies are generally much larger.

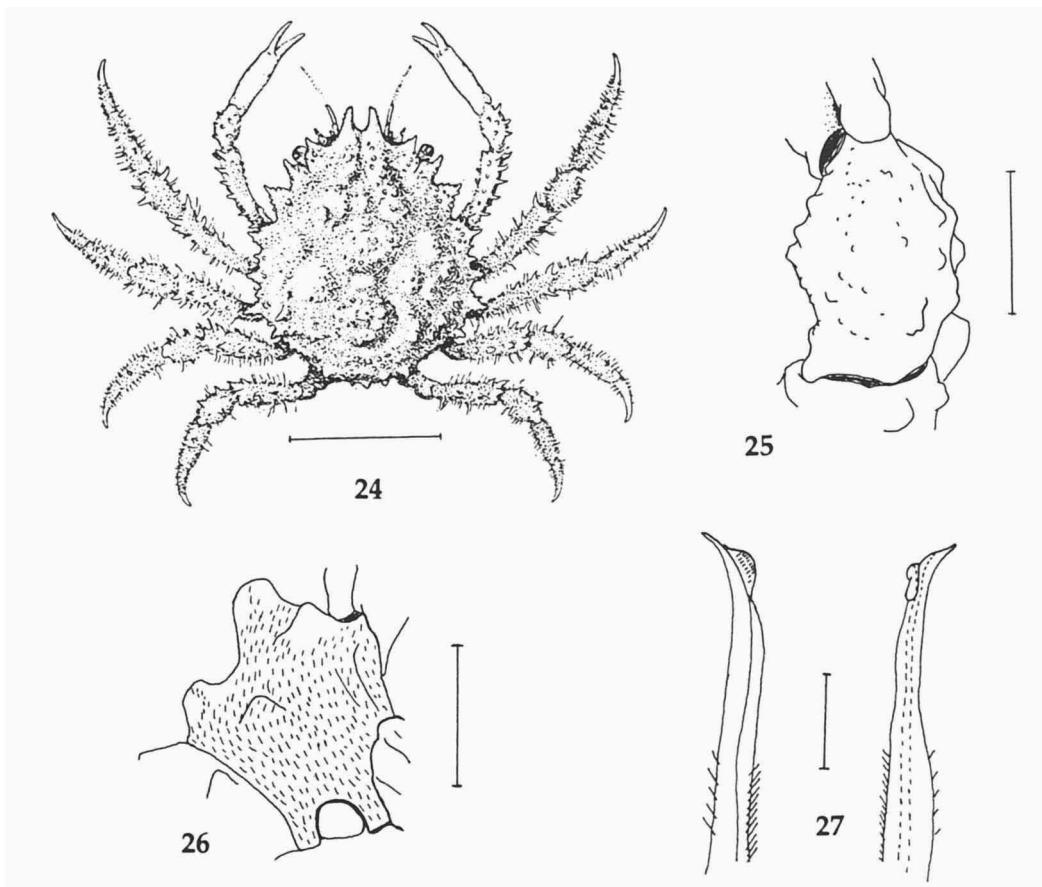
Distribution.—The species has previously been reported from the following localities: East Indies (Desmarest, 1823 (erroneous locality indication)), New Jersey, U.S.A. (Say, 1818), North Carolina, U.S.A. (Rathbun, 1892, 1925; Hay & Shore, 1918; Goy, Bookhout & Costlow, Jr, 1981), South Carolina, U.S.A. (Gibbes, 1850; Rathbun, 1892, 1925), Florida, U.S.A. (Stimpson, 1860, 1871; A. Milne Edwards, 1880; Kingsley, 1880; Rathbun, 1892, 1898, 1901, 1920, 1925; A. Milne Edwards & Bouvier, 1923; Boone, 1927, 1930; Pearse, 1932, 1932b; Wass, 1955; Menzel, 1956; Bullis & Thompson, 1965; Ray, 1974), Texas, U.S.A. (Pequegnat & Ray, 1974), southern coast U.S.A. (Rathbun, 1892), Gulf of Mexico (Rathbun, 1892, 1901; Chace, 1956a; Powers, 1977), Mexico (Verrill, 1908), Yucatan Channel, Mexico (Rathbun, 1925), Bahamas (Rathbun, 1892, 1901, 1925; Nutting, 1895; Boone, 1930; Garth, 1978), Antilles (Lamarck, 1818, 1838; H. Milne Edwards, 1832; Herklots, 1861; Gundlach, 1887), Cuba (von Martens, 1872; Gundlach, 1887; Torralbas, 1900; Rathbun, 1925; Boone, 1930; Gomez & Ortiz, 1976), Jamaica (Benedict, 1892; Rathbun, 1892, 1897, 1925; Boone, 1930), Haiti (Rathbun, 1925), Dominican Republic (Bonelly de Calventi, 1974), Puerto Rico (Gundlach, 1887; Rathbun, 1901, 1921, 1925; Guinot-Dumortier, 1960), St. Thomas (Stimpson, 1871; Aurivillius, 1889; Rathbun, 1892, 1901, 1920, 1921, 1925; Verrill, 1908), Antigua (Rathbun, 1921), Martinique (Doflein, 1899), Guadeloupe (Saussure, 1858, 1858a; Desbonne & Schramm, 1867; Rathbun, 1925), Barbados (Rathbun, 1921, 1925; Jones, 1969), St. Maarten (Rathbun, 1919, 1925), Curaçao (Rathbun, 1892, 1919, 1924, 1925), Old Providence Island (Rathbun, 1892, 1925), Colombia (Vélez, 1977), Venezuela (Rathbun, 1901, 1921, 1925; Chace, 1956; Rodriguez, 1980), French Guiana (Guinot-Dumortier, 1960), Surinam (Holthuis, 1959; Bullis & Thompson, 1965), and Brazil (Desmarest, 1823, 1825; Smith, 1869; Rathbun, 1892, 1898a, 1901, 1925; Moreira, 1901; Lemos de Castro, 1962; Coêlho, 1969, 1971; Coêlho & Ramos, 1972).

Mithrax hemphilli Rathbun, 1892 (figs. 24-27)

Mithrax hemphilli Rathbun, 1892: 263, pl. 37 fig. 2; Rathbun, 1898a: 579; Moreira, 1901: 63; Rathbun, 1901: 69; Rathbun, 1921: 83; Abele & Kim, 1986: 524, 525 fig. 6.

Mithrax (*Mithrax*) *hemphilli*; Rathbun, 1925: 395, pl. 139, pl. 259 fig. 2; Coêlho, 1969: 237; Coêlho, 1971: 140; Coêlho & Ramos, 1972: 214; Gomez & Ortiz, 1976: 15.

Material.—U.S.A., Florida.—Indian Key: 1 juv. ♀ (USNM 15823, holotype), 1885, leg. H. Hemphill. Culebra.—Ensenada Hondo: 2 ♂♂, 1 juv. ♀ (USNM 24206), 9.ii.1899, Steamer Fish Hawk. Curaçao.—Fuik Baai, entrance: 1 juv. ♂, 1 ovig. ♀ (RMNH D 37118), under rocks, 0-1 m, 13.i.1957, sta. 1051, leg. LBH.—Fuik Baai, W wall, seaside: 1 juv. ♀ (RMNH D 37119), limestone debris, 0-1 m, 13.iii.1955, sta. 1344a, coll. J. S. Zaneveld, don. PWH. Brazil.—1 ♂ (USNM 19956), 1875-77, leg. R. Rathbun, Hart Explorations.—Abrolhos Islands: 1 ovig. ♀ (USNM 21948), 27.xii.1887, Albatross 1887-88.



Figs. 24-27. *Mithrax hemphilli* Rathbun, 1892: 24. dorsal view of the animal (after Rathbun, 1892), 10 mm indicated; 25. carpus of the right cheliped (RMNH D 37118), 2 mm indicated; 26. right basal antennal segment (RMNH D 37118), 2 mm indicated; 27. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (USNM 24206), 1 mm indicated.

Description.—The carapaces of the few specimens at my disposal are somewhat longer than broad. In larger specimens than I have examined it seems reverse (Rathbun, 1925). The surface of the carapace is paved with tubercles, which are very unequal in size and elevation, and with granules. The rostrum is bifid, short and pointed. Basal antennal segment with four spines, of which the first, situated near the base of the first movable article, is smaller than the third. There is, at the same level as the third spine, an additional spine, placed more inward; this additional spine is as large as the first. The antennae are as long as the carapace. The orbit is armed with one spine below (not counting the basal antennal spines) and three above. These three spines consist of one preorbital spine, one postorbital spine, and one smaller spine in between. Sometimes there is a fourth upper orbital spine, which is merely an insignificant lobe of the preorbital spine, as observed by Rathbun (1925). The carapace has four anterolateral spines, roughened by granules, and one postero-lateral, the second to fourth anterolateral spines have sometimes a small spine in

front. The anterolateral spines increase in size posteriorly, the posterolateral spine is the smallest.

The cheliped of the juvenile male examined is nearly as long and as stout as the first pair of ambulatory legs; on the outer and upper margins the merus is armed with two rows of respectively up to 8 and 11 spines, the inner margin carries three spines; the carpus is roughened by numerous small tubercles, three of these on the inner margin are more prominent; the palm is unarmed; the fingers have a very short and narrow gape; the cutting edges are denticulate, and there is a somewhat larger denticle on both fingers halfway the gape. The first pair of ambulatory legs is somewhat longer than the carapace (including the rostrum) is. The ambulatory legs have a short-haired pile, which is densest on the propodus and the dactylus. The merus is armed with two rows of spines increasing in size distally; the carpus has only a few spines of which the distal one is larger than the others; there is a single tubercle or spine halfway the propodus.

The gonopod of the juvenile male is long and bent. It is dorsoventrally flattened and gradually tapering to a blunt tip on the outer border of the distal portion. The gonopod has a close resemblance to that of *M. spinosissimus*. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.—The largest specimen at my disposal is an ovigerous female of 18.8 mm length (including the rostrum) and 17.5 mm wide (excluding the spines) (RMNH D 37118).

Colour.—The alcohol preserved specimens examined are pinkish orange on all legs, except the tips of the fingers and the dactyli of the ambulatory legs, which are white. In both female specimens the carapace is somewhat lighter than in the males and with a specific pattern of red blotches.

Remarks.—This species is distinguishable from all other *Mithrax* species. It has a rather close resemblance to *M. holderi*, but is much less quadrangular and the upper surface of the carapace is much rougher and does remind more of *M. pilosus* Rathbun, 1892, than of any other species. Due to the presence of the closely set granules on its tubercles this species cannot be confused with any of the other Atlantic *Mithrax* species. There is a considerable variation in the proportions of the carapace, in the extent of the tuberculation of the carapace, and in the size and sharpness of the spines.

Distribution.—In literature the species has previously been reported from: Florida, U.S.A. (Rathbun, 1892, 1901, 1925), ?Cuba (Gomez & Ortiz, 1976), Puerto Rico (Rathbun, 1901, 1925), Antigua (Rathbun, 1921), Guadeloupe (Rathbun, 1925), and Brazil (Rathbun, 1892, 1898a, 1901, 1925; Coêlho, 1969, 1971; Coêlho & Ramos, 1972).

Mithrax pilosus Rathbun, 1892
(figs. 28-31)

Cancer aculeatus Herbst, 1790: 248, pl. 18 fig. B, pl. 19 fig. 104 (not Fabricius, 1780).

Mithrax aculeatus; Latreille, 1818: 224; Desmarest, 1823: 264; H. Milne Edwards, 1832: 10; White, 1847: 6; Stimpson, 1860: 188; Desbonne & Schramm, 1867: 5; von Martens, 1872: 81; A. Milne Edwards, 1875: 102; Miers, 1886: 86; Gundlach, 1887: 117; Aurivillius, 1889: 56; Benedict, 1892: 77; Torralbas,

1900: 16; Moreira, 1901: 63.

Mithrax spinosissimus; Kingsley, 1880: 390 (part) (not Lamarck, 1818).

Mithrax pilosus Rathbun, 1892: 262, pl. 39; Rankin, 1898: 235; Rathbun, 1901: 66; Rankin, 1910: 78; Nutting, 1919: 75; Rathbun, 1921: 83; Rathbun, 1933: 29; Jones, 1969: 380; Rodriguez, 1980: 287; Valdés-Muñoz, 1986: 10.

Mithrax verrucosus; Rathbun, 1892: 265 (non *Mithrax verrucosus* H. Milne Edwards, 1832)

Mithrax verrucosus var. *aculeatus*; Rathbun, 1898: 259.

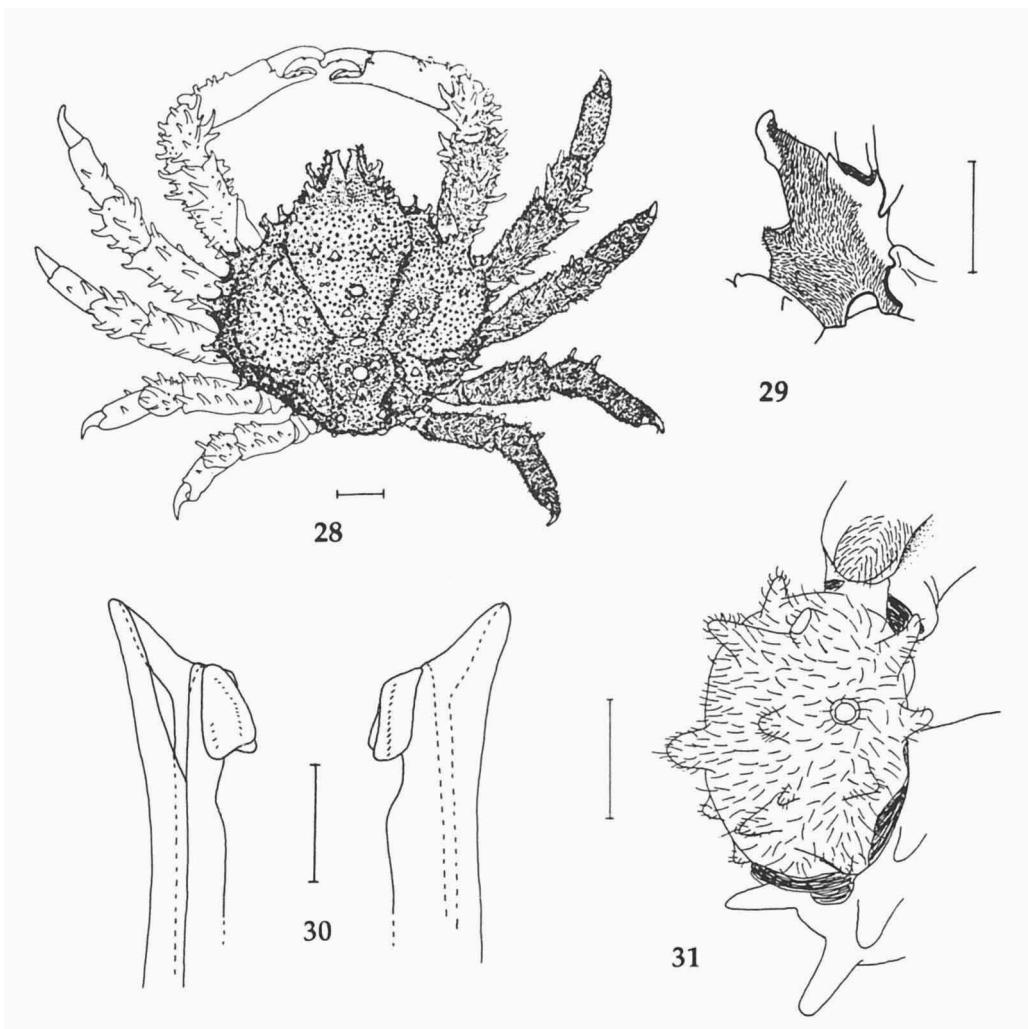
Mithrax (*Mithrax*) *aculeatus*; Young, 1900: 90.

Mithrax (*Mithrax*) *pilosus*; Rathbun, 1925: 394, pl. 138 fig. 3, pl. 258; Gomez & Ortiz, 1976: 15; Powers, 1977: 57; Vélez, 1977: 127, fig. 16.

Mithrax (*Mithrax*) *pilosus*?; Chace, 1956: 160.

Material.— U.S.A., Florida.— Key Biscayne, Bear Cut: 1 juv. ♀ (RMNH D 37115), 10.i.1965, leg. LBH. Mexico.— Vera Cruz: 1 ♂, 1 damaged specimen (MP B-459), leg. Brémont. Bahamas.— Abaco Island: 2 ♂♂ (USNM 16299, 1 ♂ holotype & paratypes *M. pilosus* Rathbun), Albatross. Antilles.— 1 ♀ (MP B-4558); 1 ♂ (MP B-12460). Jamaica.— Drunkemans Key, N side of Key: 1 ♂ (RMNH D 32481), sandy debris, 0-1 m., 15.vi.1973, sta. 1683, leg. PWH. Puerto Rico.— Reefs at Ponce: 2 ♂♂ (1 juv.) (USNM 24091), 30.i.1899, Porto Rico Exped., Steamer Fish Hawk.— Reefs at Guanica: 1 ♂ (USNM 24400), 29.i.1899, Porto Rico Exped., Steamer Fish Hawk. Culebra.— 1 juv. ♂ (USNM 24401), 11.ii.1899, Porto Rico Exped., Steamer Fish Hawk. St. Thomas.— 4 juv. ♀♀ (ZMC), leg. Riise; 1 juv. ♀ (ZMC), 1889, leg. Krebs. St. John.— 1 ♂ (ZMC), Klippe Syster, 1.iv.1906, leg. Th. Mortensen. St. Croix.— 1 juv. 28 K (ZMC), Christiansted, -ii.1906, leg. Th. Mortensen. St. Maarten.— Shore of Oyster Pond: 1 carapace (RMNH D 37144), washed ashore, 22.ii.1957, sta. 1123, leg. LBH. La Fourche.— Five Island Bay, NE shore: 1 juv. ♂ (RMNH D 8422), rocky shore with andesitic debris, some *Syringodium* and *Halodule*, 0-1.5 m., 2.vi.1949, sta. 1124, leg. PWH. St. Eustatius.— N coast, Lynch Bay: 1 juv. ♀ (RMNH D 37113), between algae, under rocks, 1.iii.1957, sta. 1135, leg. LBH. Guadeloupe.— 1 ♂ (MP B-4557); 2 specimens (MP B-18819), collection I. Desbonne. La Désirade.— Grande Anse: 1 juv. ♀ (RMNH D 37110), sandy beach, 23.i.1964, sta. 1437 or 1437A, leg. PWH. Colombia.— Dept. Magdalena, Santa Marta: 2 juv. ♂♂ (SMF 9088), 31.xii.1975, leg. M. Vélez.— Punta de Betin, jetty opposite Institute: 1 juv. ♀ (SMF 9951), on fungi and other growth, 12.x.1978, leg. H. & M. Türkay.— Isla de Aguja: 1 juv. ♂, 1 ♀ (SMF 9947), under stones, 4-5 m., -x.1978, leg. B. Werding.— Punta de la Aguja: 1 juv. ♀ (SMF), 0-1 m., 9.i.1986, leg. HGM.— Tayrona Park, Bahia Chengue, Playa oriental: 1 juv. ♀ (SMF), under stones, 0.5 m., 4.iv.1986, leg. HGM.— Ensenada de Nenguangue: 1 juv. ♀ (SMF 9946), from corals, ca. 2 m., 15.x.1975, leg. B. Werding.— Nenguangue Bight: 1 juv. ♂ (SMF 7337), leg. B. Werding. Aruba.— SE of San Nicholas, Little Lagoon: 1 juv. ♀ (RMNH D 37112), sandy lagune, 0-0.5 m., 21.iii.1957, sta. 1187, leg. LBH. Curaçao.— Boca Grandi, Savonet: 1 juv. ♂, 1 juv. ♀ (RMNH D 37117), sandy beach with beachrock, tide pools, 0-0.5 m., 24.ii.1970, sta. 1016a, leg. PWH.— Santa Marta Bay, near St. Nikolaas, entrance: 1 juv. ♂ (RMNH D 37114), in coral blocks, 4.ii.1957, sta. 1083, leg. LBH.— Piscadera Baai, near Willemstad, entrance: 1 juv. ♂, 1 juv. ♀ (RMNH D 37111), sand with mud and rocks, in sponges, between algae, sponges, hydroids, tunicates, etc., 0-1.5 m., 12.xi-xii.1956, sta. 1002, leg. LBH.— Piscadera Baai, Boca Stroink (entrance), water-pipe: 1 juv. ♂ (RMNH D 37116), iron supports in tidal flow, with dense *Pennaria*, *Didemnum*, *Styela* and *Microcosmus*, 0-1 m., 2.i.1964, sta. 1462, leg. PWH.— Spaanse Water, W side, entrance: 1 juv. ♀ (ZMA).— Caracas Baai: 1 juv. ♂ (ZMA), in coral, 17.iv.1920, leg. C.J. van der Horst. Locality unknown.— 1 ♀ (MP B-462).

Description.— The carapace is generally somewhat longer than broad, but in very large specimens broader than long. Its surface is paved with closely set granules and a dense pile of short, and long stiff hairs. There is a regular pattern of tubercles that become more prominent laterally and even may become spine-like. The rostrum is bifid, often carrying small spinules; it is relatively long. The outer margin of the rostral horns are nearly parallel and the tips are pointed towards each other. Basal antennal segment with three spines, of which the first, situated near the base of the first movable article, and the third are of the same size; the second is largest, reaching almost as far forward as the rostrum. Spinules are often present on the first two basal



Figs. 28-31. *Mithrax pilosus* Rathbun, 1892: 28. dorsal view of the animal (after Velez, 1977), 10 mm indicated; 29. right basal antennal segment (RMNH D 32481), 2 mm indicated; 30. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (MP B-4557), 1 mm indicated; 31. carpus of the left cheliped (RMNH D 32481), 2 mm indicated.

antennal spines. The antennae are about one fifth of the carapace length and bordered by hairs on the lateral and upper margins. The orbit is armed with one spine below (not counting the third basal antennal spine) and four above. These four spines consist of one preorbital spine, one postorbital spine, and two smaller spines in between. The carapace has four anterolateral spines and three posterolateral spines; the second anterolateral spine is double, the next two and the last two posterolateral spines have a small spine in front. The anterolateral spines increase in size posteriorly, while the posterolateral spines decrease in size posteriorly.

The chelipeds of the male are nearly as long and as stout as the first pair of

ambulatory legs, and covered with a dense pile that extends from the base of the cheliped to the proximal part of the palm; the upper margin of the merus is armed with five spines increasing in size distally; there are additional spines next to this row; the carpus is armed with 14 or 15 spines, of which two are on the inner margin; the upper margin of the palm is armed with up to four spines of which the second and third are almost situated next to each other; the hair cover of the proximal part of the palm extends further in the upper than in the lower portion; the fingers have a long but narrow gape; the cutting edges are denticulate, and there is a somewhat larger denticle on the edge of the dactylus halfway the gape. On the inner surface of both fingers there are two small bundles of hairs. The first pair of ambulatory legs is somewhat longer than the carapace (including the rostrum). The ambulatory legs are also covered with a dense pile that is as dense on the merus and carpus as it is on the propodus and dactylus. The upper margin of the merus is armed with two rows of five spines that increase in size distally; these two rows are situated dorsally and continued on the carpus as two spines; and posteriorly there is an additional row of three spines; the propodus carries three spines each of which is placed in a line with each of the three rows on the carpus. In juveniles the propodus shows only two spines in all.

The male gonopod is very long and only slightly bent. It is dorsoventrally flattened, regularly tapering distally to a slender tip placed at the outer margin; a triangular lobe is visible on the inner margin. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.—The largest specimen at my disposal is a male, which is 116.0 mm in length (including the rostrum) and 123.3 mm wide (excluding the spines) (MP B-12460).

Colour.—“Light reddish gray with circular spots of an intense red on the carapace, chelipeds and ambulatories” (Gundlach, 1887). In some of the juvenile alcohol preserved specimens (RMNH D 37111) the carapace has some red spots dorsally. In these specimens the sternal surface has red patches and the legs are banded with red.

Remarks.—This species closely resembles *M. verrucosus* H. Milne Edwards, 1832, but can be distinguished by having three posterolateral spines instead of one. Smaller individuals have the carapace generally longer than broad, while in *M. verrucosus* it usually is broader than long. The pile on the legs in the present species is denser and reaches on the cheliped to the palm. Several tubercles are present on the upper margin of the palm, *M. verrucosus* is less hairy and has the proximal part of the palm naked, while at the most two tiny tubercles are present there. Also the colour of the recently collected preserved specimens of *M. pilosus* are more brownish-red than the vivid violet coloured specimens of *M. verrucosus*. Although the male gonopod of *M. pilosus* resembles that of *M. verrucosus* it can be distinguished by being less bent and distinctly taller. Some very old and extremely large dry preserved specimens at the MP are like *M. verrucosus*, being broader than long, but the remnants of the pile show that it is much more dense than in the latter species, and the palm was decorated with many dorsal tubercles, this in contrary to the palm of *M. verrucosus*.

Distribution.—This species has previously been reported in the literature from: East Indies (Desmarest, 1823 (erroneous locality indication)), America (Rathbun, 1925), U.S.A., Florida, U.S.A. (Stimpson, 1860; Rathbun, 1892, 1897, 1898, 1901), Gulf of Mexico (Powers, 1977), West Indies (White, 1847; Rathbun, 1901), Antilles (H.

Milne Edwards, 1832, 1834; Gundlach, 1887), Bahamas (Rathbun, 1892, 1897, 1901, 1925; Rankin, 1898), Cuba (von Martens, 1872; Gundlach, 1887; Torralbas, 1900; Rathbun, 1925; Gomez & Ortiz, 1976), Jamaica (Benedict, 1892; Rathbun, 1892, 1897), Hispaniola, Dominican Republic (Rathbun, 1892, 1897), Puerto Rico (Gundlach, 1887; Rathbun, 1901, 1925), St. Thomas (Stimpson, 1860; Rathbun, 1892, 1897, 1925), Antigua (Rathbun, 1921), Barbados (Stimpson, 1860; Rathbun, 1921; Nutting, 1919; Jones, 1969), Panama (Stimpson, 1860), Colombia (Vélez, 1977), St. Barts (Aurivillius, 1889), Guadeloupe (Desbonne & Schramm, 1867; Rathbun, 1925), Venezuela (von Martens, 1872; Rathbun, 1901, 1925; Chace, 1956), and Brazil (Rathbun, 1892).

Mithrax verrucosus H. Milne Edwards, 1832
(figs. 32-35)

Mithrax verrucosus H. Milne Edwards, 1832: 11, pl. 4; White, 1847: 6; Gibbes, 1850: 172; Guérin-Méneville, 1856: 10; Guérin-Méneville, 1857: 26; Stimpson, 1860: 187; Desbonne & Schramm, 1867: 6; Brocchi, 1875: 94, pl. 19 figs. 185-186; A. Milne Edwards, 1875: 102; Miers, 1886: 86; Aurivillius, 1889: 57; Pocock, 1890: 507; Rathbun, 1897: 9; Rathbun, 1900a: 142; Nutting, 1919: 77; Rathbun, 1921: 83; Rathbun, 1924: 20; Pearse, 1932: 109; Pearse, 1932a: 96; Rathbun, 1933: 30; Jones, 1969: 381; Bonelly de Calventi, 1974: 25; Voss, 1976: 118, 119 fig.; Rodriguez, 1980: 287; Gore, Scotto & Yang, 1982: 525; Abele & Kim, 1986: 524, 525 figs. c-d.

Maja (Mithrax) spinipes; Herklots, 1861: 19 (not Bell, 1835).

Mithrax trispinosus Kingsley, 1879: 148.

? *Mithrax tuberculatus*; Aurivillius, 1889: 57 (not Stimpson, 1860).

Mithrax aculeatus; Rathbun, 1892: 264 (not Herbst, 1790).

Mithrax (Mithrax) verrucosus; Young, 1900: 93; Rathbun, 1925: 400, pl. 144; Boone, 1927: 39; Chace, 1956: 160; Williams, 1965: 255, figs. 235, 245B; Coêlho, 1969: 237; Coêlho, 1971: 140; Coêlho & Ramos, 1972: 215; Gomez & Ortiz, 1976: 15; Powers, 1977: 58; Williams, 1984: 336, figs. 271, 275C.

Mithrax plumosus Rathbun, 1901: 67.

Mithrax (Mithrax) ? verrucosus; Fausto, 1974: 17.

Material.— U.S.A., Florida.— Near Miami, N point Virginia Key, Norris Cut: 1 juv. ♀ (RMNH D 27381), 0-0.5 m., 12.i.1971, leg. LBH.— Key Biscayne, NE tip of Key: 1 ♀ (RMNH D 37130), sandy beach with mangrove, rocks, tidepools with *Zoanthus* and *Tetraclita*, *Thalassia* and *Halodule*, 0-1 m., 7.ix.1963, sta. 1411, leg. PWH.— Bear Cut: 1 ovig. ♀ (RMNH D 37120), under rocks, 0-1 m., 7.vi.1967, leg. LBH. Antilles.— 1 ♂, 1 ♀ (MP B-488), leg. Plée; 1 ♂ (MP B-4123). West Indies.— 1 ♂ (ZMC), leg. Testmann. St. Thomas.— 3 ♂♂ (ZMC), leg. Riise. St. John.— 1 juv. ♀ (ZMC), leg. Ørsted. La Fourche.— Five Island Bay, NE shore: 1 juv. ♂ (RMNH D 8427), rocky shore with andesitic debris, some *Syringodium* and *Halodule*, 0-1 m., 2.vi.1949, sta. 1124, leg. PWH. St. Eustatius.— Near Oranjestad, Oranjebaai: 1 juv. ♂ (RMNH D 37128), sandy beach and ruines overgrown with brown algae, 27-28.ii.1957, sta. 1132, leg. LBH.— N coast, Lynch Bay: 1 juv. ♂ (RMNH D 37129), between algae and under rocks, 1.iii.1957, sta. 1135, leg. LBH. Guadeloupe.— 1 specimen (MP B-461), leg. Duchassaing; 1 ♂ (MP B-487); 1 specimen (MP B-18820), collection I. Desbonne. Aruba.— 1 ovig. ♀ (RMNH D 1375), 1883, leg. A. J. van Koolwijk.— Rif Boekoeti, Oranjestad: 1 juv. ♂ (ZMA), 25.vi.1930, leg. PWH, ZMA. Curaçao.— Santa Martha: 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 37125), 1-4 m., 4.viii.1954.— Knip Baai, N side: 1 ♂ (RMNH D 37143), rock, sand, tidal zone, 6.ii.1949, sta. 1018A, leg. PWH.— Piscadera Baai: 1 juv. ♀ (ZMA), in coral at ca. 0.5 m., 15.xi.1973, leg. J. H. Stock.— Piscadera Baai, entrance: 1 juv. ♂ (RMNH D 37126), sandy bottom or muddy sand, in sponges, between algae, sponges, hydroids, tunicates, etc., 0-1.5 m., 12.xi-xii.1956, sta. 1002, leg. LBH.— Piscadera Baai, Boca Stroink (entrance), E, N of water-pipe: 1 ♂ (RMNH D 24952), muddy bottom, *Rhizophora* with *Didemnum*, *Diplosoma* and other ascidians, 0-0.5 m., 28.xi.1963, sta. 1464, leg. PWH.— Piscadera Baai, Binnenbaai (Pading, inner bay), S part, near Carmabi: 1 juv. ♀ (RMNH D 8428), rock debris and sand with soft, blackish mud, 0.5-1.5 m., 2.ii.1949, sta. 1028, leg. PWH; 1 juv. ♂ (RMNH D

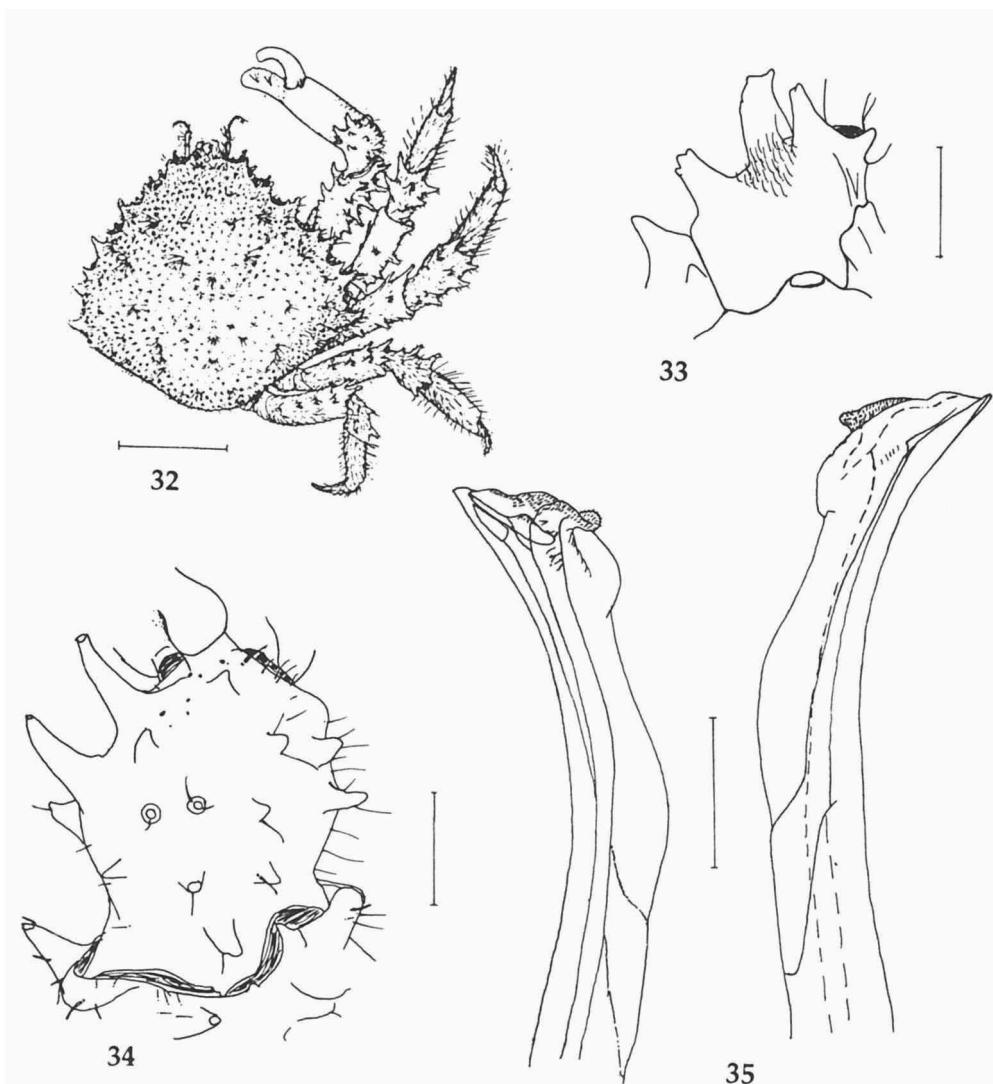
8425), *Rhizophora* with oysters, much *Didemnum* and other ascidians, 0-1 m., 2.ii.1949, sta. 1028A, leg. PWH.— Piscadera Baai, Binnenbaai (Padang, inner bay), S part, W side, Candelchi: 1 juv. ♂ (RMNH D 37123), scanty *Rhizophora* on rocky shore, many oysters with *Microcosmus*, *Styela* and *Didemnum*, 0-1 m., 18.xii.1963, sta. 1469, leg. PWH.— S coast, near Willemstad, near distillation installation: 2 ♂♂ (1 juv.) (RMNH D 12208), under rocks, i-ii.1957, sta. 1151, coll. B. van Bergeijk, don. LBH.— Boca Bartool, S side of entrance: 1 juv. ♀ (RMNH D 37121), limestone debris and muddy sand with much *Halimeda* and scanty *Thalassia*, 0-0.5 m., 12.ii.1955, sta. 1361, coll. J. S. Zaneveld, don. PWH.— Spaanse Water: 1 juv. ♂ (ZMA), from *Porites porites*, 5.v.1920, leg. C.J. van der Horst.— Caracas Baai: 1 ♀ (ZMA), under stones, 18.v.1920, leg. C.J. van der Horst.— Fuij Baai, entrance: 5 juv. ♂♂ (RMNH D 37127), under rocks, 0-1 m., 13.i.1957, sta. 1051, leg. LBH. Bonaire.— Lac, entrance: 1 juv. ♀ (ZMA), 5.x.1930, leg. PWH.— De Hoop, near Kralendijk: 2 juv. ♂♂ (ZMA), 30.x.1930, leg. PWH; 1 juv. ♀ (ZMA), 6.xi.1930, leg. PWH; 1 juv. ♂, 1 juv. ♀ (ZMA), 11.xi.1930, leg. PWH.— Kralendijk: 2 juv. ♂♂ (ZMA), 20.ix.1930, leg. PWH.— Passagranan: 2 juv. ♀♀ (ZMA), 10.x.1930, leg. PWH. Klein Bonaire.— E coast at landing: 1 juv. ♀ (RMNH D 8426), reef debris on sandy beach, 0-1.5 m., 13.ix.1948, sta. 1049A, leg. PWH. Grenada.— White Bay, Point Salines: 1 juv. ♀ (RMNH D 37124), beachrock on sand beach, pools with some *Thalassia* and *Syringodium*, 0-0.5 m., 26.i.1955, sta. 1389, leg. PWH. Trinidad.— Nelson Island: 3 ♂♂, 1 ♀ (RMNH D 23409), between rocks under water near coast, 29.ix.1965, leg. H. O. von Hagen.— Monos Island, Avalon Bay: 1 juv. ♀ (RMNH D 37122), metamorphic rock, large pebbles and some coarse sand, 0.5-1.5 m., 10.i.1955, sta. 1382, 10.i.1955, leg. PWH. Tobago.— 1 ♂ (ZMC), iv.1916 and 1.xii.1916, leg. Th. Mortensen. Locality unknown.— 1 juv. ♂ (RMNH D 37142), don. Museum Paris.

Description.— The carapace is broader than long. Its surface is paved with closely set granules of irregular size, and is nearly naked; short to longer stiff hairs appear laterally. The rostrum is bifid, short and often carrying spinules on the distal part of the horns. Basal antennal segment with three spines, of which the first, situated near the base of the first movable article, and the third are of equal size and somewhat smaller than the second. All three often carry spinules distally. The antennae are one sixth of the carapace length and laterally bordered by hairs. The orbit is armed with one spine below (not counting the third basal antennal spine) and four above. These four spines consist of one preorbital spine, one postorbital spine, and two smaller spines in between. On the preorbital and postorbital spines small spinules can be observed. The carapace has four anterolateral spines and one posterolateral; the first anterolateral spine, which is situated on the hepatic region, is bifid, the next three have a spine in front. The spine in front of the second and third anterolateral spine is almost as large as these are. The anterolateral spines increase in size posteriorly, the posterolateral spine is smaller than the anterolateral spines. There are two smaller spines placed more medially somewhat behind the level of the posterolateral spines.

The chelipeds of the male are 1.14 times as long as the carapace (including the rostrum). They are also covered with a pile, but not as dense as in *M. pilosus*. The pile consists of short and very long stiff hairs, and is more dense on the propodus and dactylus than on the merus and carpus. The merus carries on its upper margin two rows of spines that increase in size distally; these rows are continued on the carpus and then carry three spines each. Posteriorly the carpus has an additional row of three spines.

The male gonopod is long, stout and bent. It is dorsoventrally flattened, it slightly widens in the middle, from there becoming gradually more slender and finally quickly tapering to a pointed tip placed near the outer margin; a small lobe is visible in the distal part of the inner margin. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal is an adult female of 45.6



Figs. 32-35. *Mithrax verrucosus* H. Milne Edwards, 1832: 32. dorsal view of the (young) animal (after Williams, 1965), 10 mm indicated; 33. right basal antennal segment (RMNH D 23409), 2 mm indicated; 34. carpus of the right cheliped (RMNH D 23409), 2 mm indicated; 35. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 23409), 1 mm indicated.

mm length (including the rostrum) and 48.4 mm width (excluding the spines) (RMNH D 23409).

Colour.— “Carapace very dark dull red, the pincers olive above and lighter olive below, tips claret coloured, teeth white; under side of body maroon flecked with white and yellow” (Henderson in Rathbun, 1925) and in Desbonne & Schramm, 1867, give vinous red as general colour. The examined specimens are red to violet on their carapaces, except for the granules, the sternal side is yellowish and red fleched;

the legs are also flecked with red on a dark cream surface. The dactylus and opposite part of the propodus carry an orange band and have white tips.

Remarks.— Adult *M. pilosus* and *M. verrucosus* can be distinguished by the characters which have been discussed under the former species. The only reliable characters to distinguish the juvenile specimens of these two species are the pubescence and the different number of posterolateral spines. Most other differences between mature specimens of *M. pilosus* and *M. verrucosus* are not shown in their juveniles.

Distribution.— The species has previously been reported from: South Carolina, U.S.A. (Rathbun, 1925), Florida, U.S.A. (Gibbes, 1850; Stimpson, 1860; Rathbun, 1892, 1897, 1901, 1925; Boone, 1927; Pearse, 1932), West Indies (White, 1847; Rathbun, 1901), Antilles (H. Milne Edwards, 1832; Guérin Méneville, 1856, 1857; Herklots, 1861), Bahamas (Rathbun, 1901, 1925), Cuba (Rathbun, 1925; Gomez & Ortiz, 1976), Swan Islands (Rathbun, 1892, 1897, 1925), Jamaica (Rathbun, 1925), Hispaniola, Dominican Republic (Rathbun, 1925; Bonelly de Calventi, 1974), Puerto Rico (Rathbun, 1901, 1925), St. Thomas (Rathbun, 1925), Antigua (Rathbun, 1925), Barbados (Rathbun, 1921; Jones, 1969), Martinique (H. Milne Edwards, 1832), St. Barts (Aurivillius, 1889), Guadeloupe (Desbonne & Schramm, 1867; Aurivillius, 1889; Rathbun, 1897, 1925), Curaçao (Rathbun, 1924, 1925), Venezuela (Chace, 1956; Rodriguez, 1980), and Brazil (Pocock, 1890; Rathbun, 1900a, 1901, 1925; Coêlho, 1969, 1971; Coêlho & Ramos, 1972; Fausto, 1974).

Mithrax leucomelas Desbonne & Schramm, 1867

Mithrax leucomelas Desbonne & Schramm, 1867: 11; A. Milne Edwards, 1875: 97; Miers, 1886: 86.

Mithrax (Mithrax) leucomelas; Young, 1900: 93.

Mithrax (?) leucomelas; Rathbun, 1925: 421.

When this species was presented as new to science the specimen on which the description was based was already lost. It is not possible to say what the identity of this species is, where it is closely related to, or, whether it is a *Mithrax* at all. Rathbun (1925) regarded it as a species incertae and this it will probably always remain.

Distribution.— Desbonne & Schramm (1867) gave as type locality Moulé, Guadeloupe.

Mithraculus White, 1847

Mithraculus White, 1847: 7 (type *Maia sculpta* Lamarck, 1818, by subsequent designation by Miers, 1879 (= *Mithraculus sculptus* (Lamarck, 1818)); gender: masculine).

Carapace more or less convex, generally broader than long, macroscopically naked on its upper surface. The front is incised in the middle, forming two short, truncate rostral horns. Basal antennal segment carrying two tubercles or spines on its anterior outer margin only. On the orbital margins there are few lobed spines or tubercles present.

Anterolateral margin bearing three or four lobes or spines behind the orbit, pos-

terolateral margin rarely having a tubercle. Branchial region with sulci, without or with transverse grooves.

Chelipeds long and strong in fully adults; chelae deeply hollowed into a spoon-shape, and the fingers leaving between them, when closed, a considerable space. A tooth is generally present on both the propodus and dactylus in fully adult males. Ambulatory legs with a very dense brushlike coating of thick hairs and often armed with minute spinules. In many specimens the joints between the propodus and dactylus seem to work like a locking device, as often the dactylus could not be moved out of a certain position without fumbling. How this probable mechanism works is unknown to me. Another remarkable thing that struck me was that in the preserved specimens examined almost all ovigerous females had put their chelipeds under the abdomen, as if they wanted to protect their eggs. Field observations perhaps can prove or disprove the correctness of this observation. The species belonging to *Mithraculus* can even when adult, be associated with certain species of sea anemones and sponges, while no such records are known for adult *Mithrax* species.

Key to the western Atlantic species of *Mithraculus* White

1. Carapace distinctly longer than broad *M. cinctimanus* Stimpson, p. 33
- Carapace more or less distinctly broader than long 2
2. Lateral lobes of the carapace rounded or blunt 3
- Lateral lobes of the carapace acute 4
3. Oblique branchial sulci not broken up by transverse grooves. Three lobes on the anterolateral margin of the carapace. Carpus of the cheliped uneven. Colour orange or yellowish to mottled green above, tips of the chelipeds and the underside chiefly white. Dactylus of the ambulatory legs salmon pink to white *M. coryphe* (Herbst), p. 36
- Oblique branchial sulci clearly broken up by transverse grooves and forming small prominences. Four lobes on the anterolateral margin of the carapace. Carpus of the cheliped smooth. Colour olive to bluish green, dactylus white *M. sculptus* Lamarck, p. 43
4. Oblique branchial sulci not broken up by transverse grooves. Four acute spines on the anterolateral margin of the carapace. Carpus of the cheliped smooth, except for one spinule (only acute in young specimens) on the inner distal part of the carpus. Colour pink or chestnut to uniform yellowish brown or greenish brown. In juveniles sometimes a yellow line on the median line of the carapace, and the legs also yellow *M. forceps* A. Milne Edwards, p. 48
- Oblique branchial sulci broken up by transverse grooves, forming small prominences. Three acute spines on the anterolateral margin of the carapace and one posterolateral. Carpus of the cheliped obscurely tuberculate. Colour chestnut with red blotches on the dorsum and posteriorly sometimes *M. ruber* Stimpson, p. 53

Mithraculus cinctimanus Stimpson, 1860
(figs. 36-39)

Mithraculus cinctimanus Stimpson, 1860: 186; A. Milne Edwards, 1875: 112; A. Milne Edwards, 1878: pl. 23 fig. 3; Kingsley, 1880: 389; A. Milne Edwards, 1880: 2; Aurivillius, 1889: 59.

Mithrax affinis Desbonne & Schramm, 1867 (reprinted in 1914, Berlin): 10.

Mithrax cinctimanus; Miers, 1886: 87; Benedict, 1892: 77; Rathbun, 1892: 268; Rathbun, 1897: 11; Rankin, 1898: 235; Rathbun, 1901: 70; Rankin, 1910: 78; Rathbun, 1919: 344; A. Milne Edwards & Bouvier, 1923: 391; Rathbun, 1924: 21; Rathbun, 1933: 32; Colin, 1978: 367, 369; Abele & Kim, 1986: 526, 527 figs. e-g.

Mithrax (*Mithraculus*) *cinctimanus*; Young, 1900: 95.

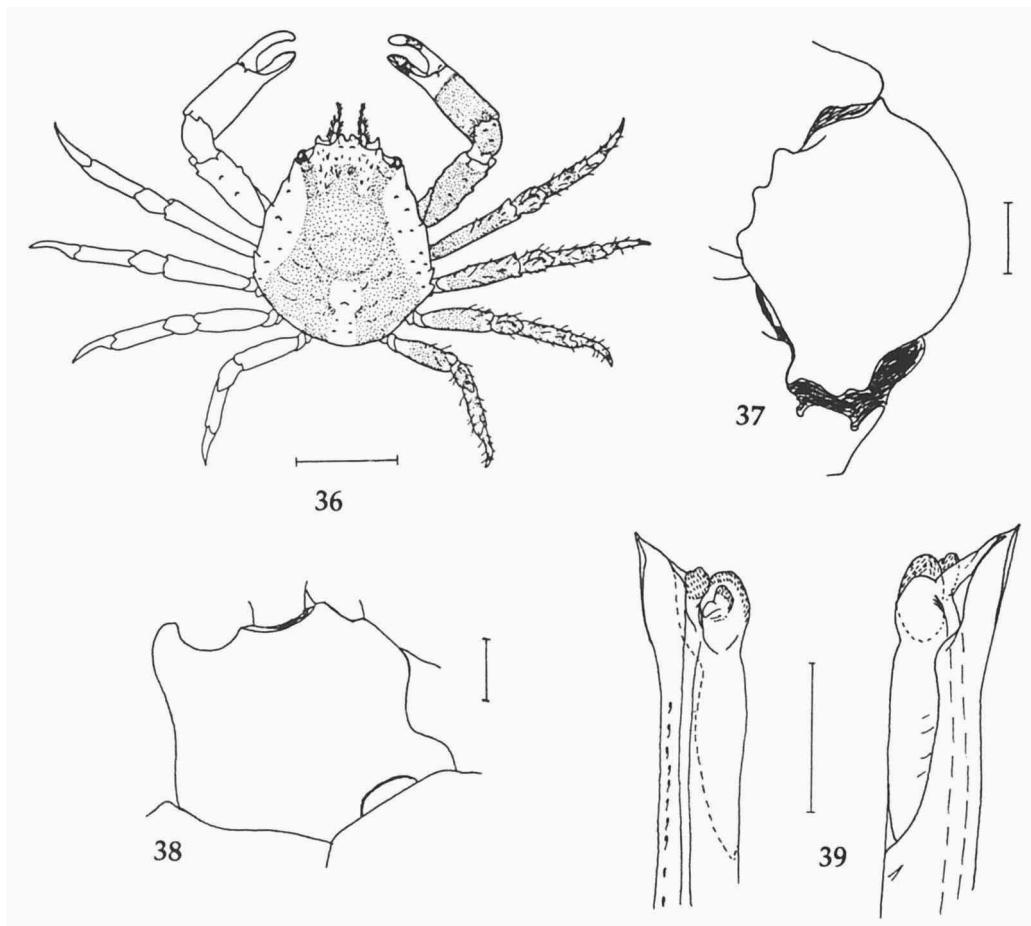
Mithrax (*Mithraculus*) *cinctimanus*; Rathbun, 1921: 85; Rathbun, 1925: 438, pl. 158; Manning, 1970: figs. 1a, 2a; Bonelly de Calventi, 1974: 25; Powers, 1977: 54; Garth, 1978: 331; Patton, 1979: 55.

Mithrax (*Mithraculus*) *commensalis* Manning, 1970: 157, figs. a-f, 1b, 2b; Vélez, 1977: 132, fig. 23.

Mithrax commensalis; Hazlett, 1979: 576.

Material.— **U.S.A.**— 1 ♂ (MP B-19458), leg. A. Agassiz, U.S. Coast Survey "Blake". **Bahamas.**— Crooked Island: 1 ♂ (ZMA). **West Indies.**— 1 ♂ (ZMC), leg. Bang; 3 ovig. ♀♀ (BMNH), leg. W. R. Forrest, Stebbing collection. **Jamaica.**— N coast, Discovery Bay: 1 juv. ♂, 7 juv. ♀♀ (RMNH D 36904), on *Condylactis* spec., 1 crab per sea anemone, -vi.1969, leg. J. Shoup. **St. Thomas.**— 1 juv. ♀ (ZMC, syntype *M. cinctimanus* Stimpson), leg. Riise; 1 ♂ (ZMC), leg. Riise; 1 juv. ♀ (ZMC), 1889, leg. Krebs; 1 ♂ (MP B-449), leg. A. Milne Edwards. **Barbuda.**— Great Lagoon, Lobster Point, N of Palm Beach: 1 ♂ (RMNH D 36905), *Rhizophora* in sandy mud with *Thalassia* and *Halodule*, 0-1 m., 23.vii.1967, sta. 1534, leg. PWH. **Guadeloupe.**— 1 ♂ (MP B-4569), leg. A. Milne Edwards; 2 ♀♀ (1 juv.), 2 specimens (MP B-18813, syntypes of *Mithrax affinis* Desbonne & Schramm), collection I. Desbonne. **Dominica.**— Rodney's Rock, N. of Rouseau: 1 ♂ (USNM 127309, holotype of *M. commensalis* Manning), collected on disc of sea anemone, probably *Stoichactis*, 28.ii.1966, leg. R. B. Manning. **Barbados.**— 1 ♀ (SMF 9082).— Bridgetown: 1 juv. ♂ (ZMC), 10.xi.1891, leg. Chr. Levensen. **Colombia.**— Punta Arenas near Barbacous, Isla Grande, Islas del Rosario, Dept. Bolívar: 1 ♂, 1 ovig. ♀ (SMF 9942), under stones, 21.x.1978, leg. D. Rodriguez.— Santa Marta: 1 juv. ♂ (SMF), -xi.1973, leg. M. Vélez. **Curaçao.**— Piscadera Baai: 1 juv. ♀ (ZMA), in coral, 0.5 m., 15.xi.1973, leg. J. H. Stock; 1 ♀ (ZMA), living associated with *Condylactis gigantea*, 16.xi.1973, leg. J. H. Stock.— Piscadera Baai, Boca Stoink (entrance), W: 1 juv. ♂ (RMNH D 36907), small sandy inlet with *Rhizophora*, *Didemnum* and other ascidians, 0-0.5 m., 14.xii.1963, sta. 1460, leg. PWH.— Spaanse Water: 2 ♂♂, (1 juv.), 5 ♀♀ (4 juv., 1 ovig.) (ZMA), from *Porites porites*, 13.iv. and 4 and 5.v.1920, leg. C.J. van der Horst; 2 ♀♀ (1 ovig.) (RMNH D 30365), 1971, leg. J. C. den Hartog, RMNH D 30365; 1 ♀ (RMNH D 30366), 19.viii.1971, sta. 18, leg. J. C. den Hartog.— Spaanse Water, near Nieuwpoort, in front of the beach: 1 juv. ♀ (RMNH D 36903), in sponges, 18.iii.1956, leg. J. S. Zanевeld.— Spaanse Water, Brakke Put, near Jongensstad: 3 ♀♀ (2 juv.) (RMNH D 36902), sandy bottom with mud and rocks, on rocks, between algae, 31.xii.1956, sta. 1030, leg. LBH.— Spaanse Water, inner bay, Jan Sofat islet: 1 juv. ♂, 1 juv. ♀ (RMNH D 36906), rocky with *Rhizophora* in mud, 0-1 m., 17.xi.1968, sta. 1629, leg. PWH.— Spaans lagoon: 1 ♂ (RMNH D 2245), shallow water, between corals (*Madrepora*), 7.vii.1905, leg. J. Boeke.— Slangenbaai: 1 juv. ♂ (RMNH D 30362), on the tentacles of *Condylactis gigantea* (Weinland), 7.viii.1973, leg. J. C. den Hartog.— Caracas Baai: 1 ♀ (ZMA), 1.v.1920, leg. C.J. van der Horst. **Bonaire.**— Lac (entrance): 1 ♂ (ZMA), 5.x.1930, leg. PWH. **Tobago.**— 2 juv. ♀♀ (ZMC), iv.1916 and 1.xii.1916, leg. Th. Mortensen. **Locality unknown.**— 1 ♀ (ZMC).

Description.— The carapace is longer than broad, rather convex; the branchial sulci are not noteworthy broken up by transverse grooves. The rostrum is short and pointed, incised by a V-shaped notch. Basal antennal segment wide and with two spines, of which the first, situated at the base of the first movable article, is very small; the second is very large and situated at the antero-external margin. The antennae are 0.17 times as long as the carapace. The orbit is armed with one spine below (not counting the basal antennal spines) and four above. These four spines consist of one preorbital spine, one postorbital spine, and two smaller spines in between. The carapace has four anterolateral spines, the first and third being somewhat larger than the other two.



Figs. 36-39. *Mithraculus cinctimanus* Stimpson, 1860: 36. dorsal view of the animal (after Velez, 1977), 10 mm indicated; 37. carpus of the right cheliped (RMNH D 36905), 2 mm indicated; 38. right basal antennal segment (RMNH D 36905), 1 mm indicated; 39. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 36905), 1 mm indicated.

The chelipeds of the male are much stouter and 1.25 times as long as the first pair of ambulatory legs; the inner margin of the basi-ischium has distally one spine; the merus is triangular in transverse section and has respectively two large and three smaller spines on the upper and outer margin; the carpus is smooth, except for three tubercles on the upper inner margin; the palm is smooth and compressed; the fingers have a broad and long gape, the cutting edges are smooth except for the spooned tips, a tooth is present at one third of the gape on the dactylus and another tooth is present at two thirds of the gape on the propodus. In the females the gape is narrower and only the tooth on the dactylus can be observed in large specimens. On the inner margin of the spooned tips of the fingers there are three bundles of hairs. The first pair of ambulatory legs is 1.3 times as long as the carapace (including the rostrum). The ambulatory legs are covered with a brush-like coating of stout and slender setae. Small tubercles sometimes are present on the merus only. Some small spin-

ules can be observed below on the merus of the first two pairs of ambulatory legs.

The male gonopod is long, stout and straight. It is dorsoventrally flattened, and after a slight incision followed by a lobe that is partly covered with a regular pattern of short hairs and quickly tapers to a broad, but pointed tip at the outer margin. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal is an adult male of 24.3 mm long (including the rostrum) and 23.4 mm wide (including the spines) (RMNH D 36905).

Colour.— The carapace is cream coloured with an olive-green to green-brown pattern as shown in fig. 36. The legs are banded in the same colour as the pattern on the carapace.

Remarks.— Except for the fact that the carapace of this species is longer than broad it has all characters typical for *Mithraculus*. The proportions of length and width of the carapace distinguish this species from all other within the genus.

This species is often found associated with certain species of sponges and sea anemones. Mr. J. C. den Hartog collected it in between the tentacles of *Condylactis gigantea* (Weinland). In the literature it is reported to be associated with the corals: *Porites porites* (Pallas) (Rathbun, 1923), *Porites furcata* Lamarck (Rathbun, 1924), the sea anemones: *Condylactis gigantea* (Weinland) (Powers, 1977; Vélez, 1977; Patton, 1979), *Stichodactyla* spec. (reported under the synonymous name *Stoichactis* by Manning, 1970 (J. C. den Hartog, pers. comm.)), *Stichodactyla helianthus* (Ellis) (Powers, 1977; Vélez, 1977; Patton, 1979), and *Lebrunia danae* (Duchassaing & Michelotti) (Powers, 1977).

Distribution.— This species has been reported previously from: Florida, U.S.A., (Stimpson, 1860; Kingsley, 1880; A. Milne Edwards, 1880; Rathbun, 1892, 1901, 1925; A. Milne Edwards & Bouvier, 1923), Gulf of Mexico (Rathbun, 1901; Powers, 1977), West Indies (Rathbun, 1901), Bahamas (Rathbun, 1892, 1925; Rankin, 1898, 1910; Garth, 1978); Jamaica (Benedict, 1892; Rathbun, 1892, 1897, 1925; Rankin, 1898, 1910; Colin, 1978; Patton, 1979), Puerto Rico (Rathbun, 1901, 1925; Colin, 1978), St. Thomas (Stimpson, 1860; Rathbun, 1892, 1925; Rankin, 1898, 1910; Manning, 1970), Antigua (Rathbun, 1921, 1925), Colombia (Vélez, 1977), Guadeloupe (Desbonne & Schramm, 1867 (1914); Rankin, 1898, 1910), Dominica (Manning, 1970), St. Maarten (Rathbun, 1919, 1925; Manning, 1970), and Curaçao (Aurivillius, 1889; Rathbun, 1892, 1901, 1919, 1924, 1925).

Mithraculus coryphe (Herbst, 1801)
(figs. 40-43)

Cancer coronatus Herbst, 1785: 184, pl. 11 fig. 63 (not Molina, 1782).

Cancer coryphe Herbst, 1801: 8.

Maja (Mithrax) sculpta; de Haan, 1837: pl. F; Herklots, 1861: 19 (not Lamarck, 1818).

Mithraculus coronatus; White, 1847: 7 (part); Stimpson, 1860: 186; Smith, 1869: 1; Stimpson, 1871: 118; Streets, 1871: 239; A. Milne Edwards, 1875: 106, pl. 20 fig. 1; Kingsley, 1880: 388; Aurivillius, 1889: 58.

Mithrax sculptus; Desbonne & Schramm, 1867 (reprinted in 1914, Berlin): 9 (not Lamarck, 1818).

Mithrax coronatus; Miers, 1886: 87, 89; Benedict, 1892: 77; Rathbun, 1892: 272; Nutting, 1895: 123; Rankin, 1898: 236; Rathbun, 1898: 260; Moreira, 1901: 62; Rankin, 1910: 79.

Mithrax (Mithraculus) coronatus; Pocock, 1890: 510.

Mithrax coryphe; Rathbun, 1897: 11; Rathbun, 1898a: 579; Rathbun, 1900a: 143; Rathbun, 1901: 71; Nutting, 1919: 75; Rathbun, 1924: 20; Rathbun, 1933: 31; Schmidt, 1939: 29; Jones, 1969: 382; Rodriguez, 1980: 288, pl. 24; Gore, Scotto & Yang, 1982: 525; Abele & Kim, 1986: 528, 529 fig. a.

Mithrax (Mithrax) coronatus; Young, 1900: 98.

Mithrax (Mithraculus) coryphe; Rathbun, 1921: 84; Rathbun, 1925: 426, pl. 153; Chace, 1956: 161; Coêlho & Ramos, 1972: 216; Bonelly de Calventi, 1974: 26; Fausto, 1974: 17; Gomez & Ortiz, 1976: 16; Garth, 1978: 331; Scotto & Gore, 1980: 551.

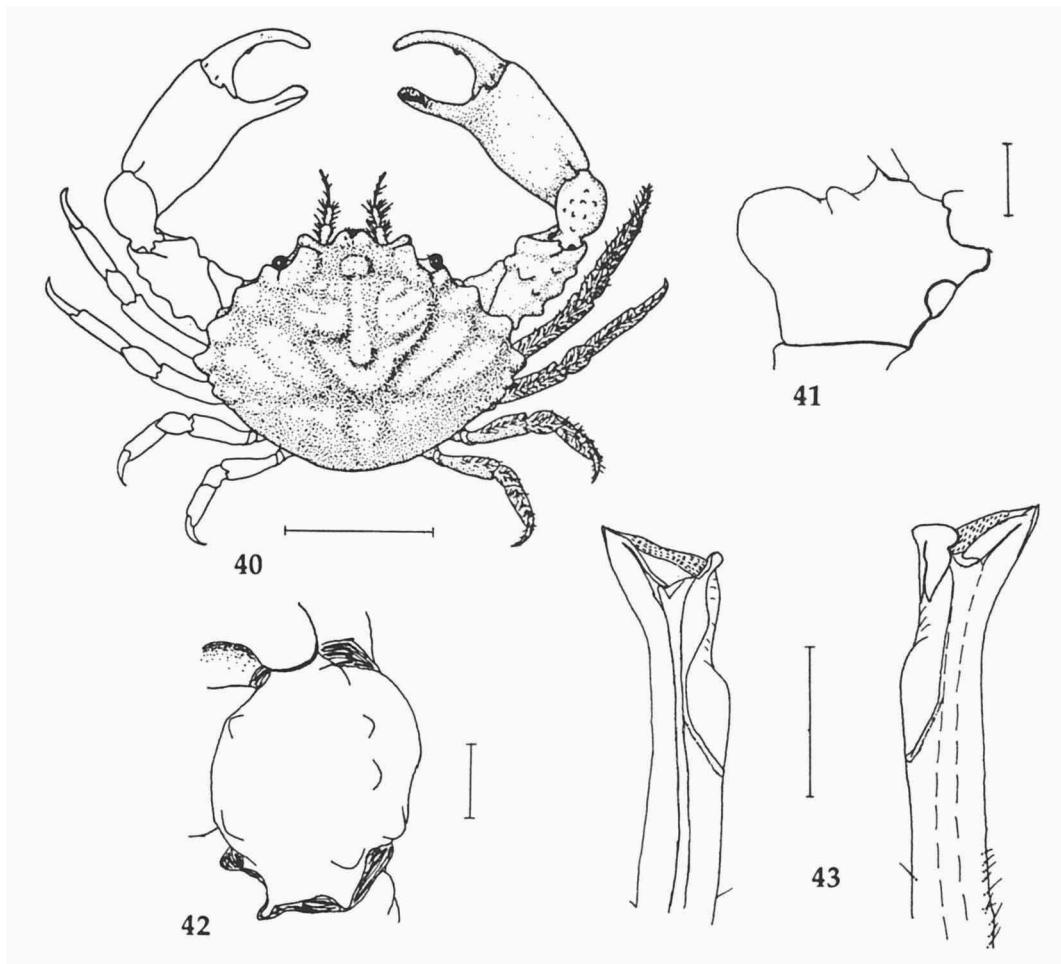
Material.— U.S.A., Florida.— E coast, S of Fort Worth, Boynton Beach: 12 ♂♂ (10 juv.), 8 juv. ♀♀ (RMNH D 36801), between tubes of *Fragmentopoma* spec., 22.vi.1970, leg. LBH.— S of Miami, outside Elliot Key: 11 ♂♂ (4 juv.), 10 ♀♀ (5 juv., 3 ovig.) (RMNH D 36799), between sponges, 2-3 m., 29.xii.1964, leg. LBH.— E of Elliot Key, Long Reef: 6 ♂♂ (1 juv.), 6 ♀♀ (4 juv., 2 ovig.) (RMNH D 36800), between corals and rocks, 27.vii.1973, leg. D. Opresko.— Virginia Key, NE side: 2 juv. ♂♂ (RMNH D 36864), seagrass, with pieces of coral and concrete, 1-2 m., 4.ix.1964, sta. 1408A, leg. PWH.— N point Key Biscayne, Bear Cut: 1 juv. ♀ (RMNH D 36802), seagrass, sponges, 0-1 m., 27.vii.1966, leg. LBH. Gulf of Mexico.— Mexican Bight: 1 ♂ (ZMC), leg. Liebmam. West Indies.— 1 ovig. ♀ (ZMC), leg. Suenson; 1 ♂, 1 juv. ♀ (ZMC), leg. Bang. Antilles.— 1 ♂ (RMNH D 37051), don. Mus. Paris. Cayman Brac.— W point, The Ledges: 9 juv. ♂♂, 2 juv. ♀♀ (RMNH D 36832), sandy shore with limestone debris, 0-0.5 m., 3.vi.1973, sta. 1703, leg. PWH. Cuba.— 1 ♂, 2 ♀♀ (1 ovig.) (MP B-19459), 1914, leg. E. Boury; 2 ♂♂ (1 juv.), 4 ♀♀ (1 juv., 2 ovig.) (MP B-19461), 1914, leg. E. de Boury. Jamaica.— Drunkemans Key, N side: 9 juv. ♂♂, 1 juv. ♀ (RMNH D 36822), sandy debris, 0-1 m., 15.vi.1973, sta. 1683, leg. PWH. St. Thomas.— 8 ♂♂, 1 ovig. ♀ (ZMC), leg. Suenson; 1 ♂ (MP B-450); 1 ♂ (MP B-452), leg. A. Milne Edwards. St. John.— Turner Bay, E part: 1 juv. ♂ (RMNH D 36847), 1 ♂ (RMNH D 36851), porfiritic rock, boulders and coarse sand, 0-0.5 m., 18.vi.1955, sta. 1407, leg. PWH. Anguilla.— N of Sandy Ground: 8 ♂♂ (5 juv.), 10 juv. ♀♀ (RMNH D 7950), 10 juv. ♂♂, 2 juv. ♀♀ (RMNH D 36866), beachrock with sandy reef, 1-2.5 m., 4.ix.1948, sta. 1142, leg. PWH. St. Maarten.— Great Bay, NE coast: 5 ♂♂ (4 juv.), 5 ♀♀ (4 juv., 1 ovig.) (RMNH D 7952), 14.vi.1949, leg. PWH.— NE shore: 1 ♂, 6 ♀♀, (2 juv., 1 ovig.) (RMNH D 7969), rocky beach with sandy debris, some *Thalassia*, 0.5-1 m., 16.v.1949, sta. 1127 leg. PWH.— E shore, in NE corner, near Philipsburg: 1 juv. ♂ (RMNH D 36900), at night, in seagrass, 0.5 m., 23.ii.1957, sta. 1129, leg. LBH.— Near Philipsburg: 18 ♂♂ (9 juv., 23 ♀♀ (12 juv., 9 ovig.) (RMNH D 36875), between rocks and algae, 0-1 m., 16-17.ii.1957, leg. LBH.— Freshwater Pond, W of Philipsburg: 3 ♂♂ (RMNH D 36885), 17 and 20.ii.1957, leg. LBH.— Great Bay, Point Blanche Bay: 1 ovig. ♀ (RMNH D 7956), hard tuffoid rocks with limestone, tide pools, 0-0.5 m., 26.vi.1949, sta. 1125, leg. PWH.— Great Bay, Northeastern neach, Philipsburg: 1 juv. ♀ (RMNH D 7949), small wooden wreck on sand, 0-1 m., 26.v.1949, sta. 1128A, leg. PWH.— Oyster Pond, SE part near mouth: 1 juv. ♀ (RMNH D 36849), sandy part of lagoon, with some *Rhizophora* and patches of *Thalassia*, *Syringodium* and *Halimeda*, 0-1.5 m., 13.x.1963, sta. 1429, Leg. PWH. Saba.— Fort Bay Pier: 3 ♀♀ (1 juv.) (RMNH D 36828), wooden poles, recently constructed, 0-1 m., 7.vii.1973, sta. 1705, leg. PWH. St. Barts.— Public, near Gustavia: 1 juv. ♀ (RMNH D 7954), 1 juv. ♀ (RMNH D 36836), rocky shore with sandy andesitic debris, 0-1 m., 4.vi.1949, sta. 1121, leg. PWH. St. Eustatius.— Oranje Baai: 2 ♂♂ (1 juv.), 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 36869), from seaweeds, SCUBA-diving, 1.5 fathom (= 2.72 m.), 6 and 12.viii.1957, leg. P. A. van den Heuvel; 54 juv. ♂♂, 26 juv. ♀♀ (RMNH D 36796), 50 m. off the shore, 1.5 fathom (= 2.72 m.), 16.viii.1957, leg. P. A. van den Heuvel.— Near Oranjestad: 4 juv. ♂♂, 3 ♀♀ (1 juv., 1 ovig.) (RMNH D 36878), sandy beach and ruins with brown algae, 27-28.ii.1957, leg. LBH.— Lynch Bay, N: 26 ♂♂ (23 juv.), 11 juv. ♀♀ (RMNH D 36888), between algae and under rocks, 1.iii.1957, leg. LBH. Barbuda.— Martello Tower Beach: 2 juv. ♂♂ (RMNH D 36840), pieces of limestone rock on sandy beach, algae, 0.5-1 m., 8.ii.1955, sta. 1394.— Two Feet Bay, E coast: 1 juv. ♂ (RMNH D 36852), 1 ♂ (RMNH D 36855), limestone cliff, sandy rocks pools with some *Thalassia*, 0-0.5 m., 10.vii.1955, sta. 1395, leg. PWH. Antigua.— Deep Bay, near Fort Barrington: 1 juv. ♂, 2 juv. ♀♀ (RMNH D 36846), volcanic tuffoid rock, pebbles and coarse sand, 0-1 m., 17.vii.1955, sta. 1393, leg. PWH.— Dickinson Bay, N part: 5 juv. ♂♂, 3 ♀♀ (2 juv., 1 ovig.) (RMNH D 36842), boulders in sand with *Thalassia* and *Syringodium*, 0.5-1 m., 19.vii.1967, sta. 1540A, leg. PWH; 3 ♂♂, (1 juv.), 1 ♀ (RMNH D 36816), eroded *Thalassia* flat, 0.5-1 m., 26.vi.1967, sta. 1540B, leg. PWH. Guadeloupe.— 1 ♀ (MP B-448), leg. Duchassaing; 1 specimen (MP B-18811), collection I. Desbonne; 2 ♂♂, 1 ♀, 3 specimens (MP B-18822), collection I. Desbonne. La Désirade.— Grande Anse, near bridge: 1 juv. ♀ (RMNH D 36808), muddy rock debris, small beds of *Thalassia* and *Halodule*, branches of *Hippomane* tree, 0-1 m., 23.i.1964, sta. 1437, leg. PWH; 4 juv. ♂♂, 4 juv. ♀♀ (RMNH D 36854), beachrock with sandy debris,

pools, 0-1 m., 23.i.1964, sta. 1437A, leg. PWH; 3 juv. ♀ (RMNH D 36839), poles of former jetty at landing, wooden and concrete poles in muddy sand, *Thalassia* beds with *Syringodium*, 0-1.5 m., 25.i.1964, sta. 1438, leg. PWH. **Martinique**.— 1 juv. ♂ (RMNH D 36841), sta. 764, leg. PWH; 1 ♂, 1 ♀ (MP B-451), leg. Plée. **Barbados**.— 1 ♂ (ZMA).— SW coast, Carlisle Bay: 1 ♂, 4 ovig. ♀ (RMNH D 24187), under coral blocks on sand and algae, just below water at low tide, 12.viii.1966, leg. J. Darlington, don. H. O. von Hagen. **Honduras**.— Utila: 5 ♂♂ (2 juv.), 9 ♀♀ (2 juv., 7 ovig.) (SMF 9079), 1951, leg. H. Peters; 1 juv. ♂, 1 juv. ♀ (SMF 10971 (part)). **Colombia**.— Dept. Bolívar, S of Cartagena, Islas del Rosario, Isla Brande, Punta Arenas, near Barbaceos: 1 juv. ♂ (SMF 9939), low tide under stones.— 1 ♂ (SMF 7361), Dept. Magdalena, airport; 1 ♂ (SMF 7361), 21.x.1978, leg. J. Rodriguez.— Santa Marta: 1 juv. ♀ (SMF), 18.xi.1985, leg. HGM; 1 juv. ♂ (SMF 9080), 27.i.1976, leg. M. Vélez.— Vicinity of Santa Marta: 1 ♂ (SMF 7363), leg. M. Vélez; 1 ♂ (SMF), *Thalassia*, 1-2 m., 13.i.1956, leg. HGM.— Punta de Betin: 1 juv. ♀ (SMF), 0-1 m., 28.i.1986, leg. HGM; 1 juv. ♀ (SMF), under stones, 0-0.5 m., 31.xi.1985, leg. HGM.— Punta de Betin, harbour opposite Institute: 1 ovig. ♀ (SMF 9940), -x.1978, leg. H. & M. Türkay.— Tayrona Parc, Bahia Concha: 1 ♂ (SMF), from brown algae, 12.ii.1986, leg. HGM; 31 ♂♂ (19 juv.), 13 juv. ♀♀ (SMF), from *Digenia simplex*, 22.v.1985, leg. HGM; 3 juv. ♂♂ (SMF), 3.iv.1986, leg. HGM; 4 ♀♀ (3 juv.) (SMF), 2.v.1986, leg. HGM; 2 juv. ♂♂ (SMF), from *Sargassum cymosum*, 9.ix.1985, leg. HGM; 1 juv. ♂ (SMF), 3.iv.1986, leg. HGM; 1 juv. ♂ (SMF), 2.v.1986, leg. HGM; 1 juv. ♂, 2 ♀♀ (1 ovig.) (SMF), from dead *Colpophyllia natans*, 1 m., 13.viii.1985, leg. HGM.— Ensenada de Chengue: 1 ♂, 5 ovig. ♀♀ (SMF 9938), low tide, under stones, 28.x.1978, leg. H. & M. Türkay.— Bahia de Chengue, Playa occidental at reef: 1 juv. ♀ (SMF), on *Halimeda*, 19.iv.1986, leg. HGM.— ?Bahia de Changue, Playa oriental: 12 ♂♂ (9 juv.) (SMF), 0.5 m., under stones, 4.iv.1986, leg. HGM.— Bahia de Gaíraca: 1 juv. ♂ (ZMA), at 15-5 m., 29.ii.1896, Yacht "Chazalie".— 1 juv. ♂, 1 juv. ♀ (SMF), 25.x.1978.— Ensenada de Nenguangue: 2 ♀♀ (SMF 9936), from corals, ca. 2 m., 15.x.1978, leg. B. Werding.— Bahia de Nenguangue: 1 juv. ♀ (SMF), *Thalassia*, 0.5-2 m., 3.vii.1985, leg. HGM; 2 juv. ♀♀ (SMF), *Digenia* and *Sargassum*, 30.vii.1985, leg. HGM.— Nenguangue Bight: 1 ♂ (SMF 7338), leg. B. Werding; 2 ♂♂, 1 ovig. ♀ (SMF 6863), on mud in Mangrove, -xii.1974, leg. Schmalfuss.— Playa de Canaveral, W. of mouth Rio Piedras: 2 ♂♂, 6 ♀♀ (4 ovig.) (SMF 9937), under stones, 3-4 m., 12.xii.1978, leg. Wedler. **Aruba**.— 7 juv. ♂♂, 5 juv. ♀♀ (RMNH D 14776), 1 ♂ (RMNH 37050), 1958-1959, leg. P. A. van den Heuvel.— Malmok, Arasij: 7 ♂♂ (5 juv.), 7 ♀♀ (4 juv., 3 ovig.) (RMNH D 36807), 2 juv. 3, 4 juv. 4 (RMNH D 36824), 2 juv. ♂♂, 2 juv. ♀♀ (RMNH D 36833), 7 juv. ♂♂, 4 juv. ♀♀ (RMNH D 36862), rocky beach with sand and diorite boulders, *Thalassia* flat with *Porites*, 0-1 m., 14.viii.1955, sta. 1301, leg. PWH.— Oranjestad, Punta Braboe: 2 juv. ♂♂, 2 juv. ♀♀ (ZMA), 18.vi.1930, leg. PWH.— Punta Braboe, N side, W of Oranjestad: 1 juv. ♀ (RMNH D 7955), exposed limestone, sandy debris, 0-1 m., 3.i.1949, sta. 1002, leg. PWH.— Reef Boekoe: 1 ovig. ♀ (ZMA), 25.vi.1930, leg. PWH.— Poos Chikite, rock-coast S of Palm Beach, N of Oranjestad: 10 ♂♂ (5 juv.), 9 ♀♀ (7 juv., 1 ovig.) (RMNH D 36877), between corals, 0-1 m., 18.iii.1957, sta. 1180, leg. LBH; 3 ♂♂ (1 juv.), 3 juv. ♀♀ (RMNH D 36899), between brown algae, 0-0.5 m., 18.iii.1957, sta. 1182, leg. LBH; 21 ♂♂ (13 juv.), 9 ♀♀ (7 juv., 2 ovig.) (RMNH D 36874), in corals, 22.iii.1957, sta. 1191, leg. LBH.— Lagoon at SW coast, NW of Savaneta: 2 juv. ♀♀ (RMNH D 36893), at night, in seagrass, 21.iii.1957, sta. 1190, leg. LBH.— Little Lagoon, SE of St. Nikolaas: 2 ♂♂, 2 juv. ♀♀ (RMNH D 36876), sandy lagoon, between and under calcareous algae (*Halimeda*), 0-1.5 m., 21.iii.1957, sta. 1187, leg. LBH. **Curaçao**.— 4 ♂♂ (3 juv.) (RMNH D 36845), 1955, leg. PWH.— W Point: 2 juv. ♂♂ (ZMA), 14.v.1920, leg. C.J. van der Horst.— 1 juv. ♂ (RMNH D 36823), Boca Grandi, sandy beach with beachrock, tide pools, 0-0.5 m., 24.ii.1970, sta. 1016A, leg. PWH.— (Savonet): 1 juv. ♂, 2 juv. ♀♀ (ZMA), 2.v.1930, leg. PWH.— Playa Djerimi, N corner: 2 juv. ♂♂ (RMNH D 7944), 12 juv. ♂♂ (RMNH D 36827), rocky shore with sand, 0-0.5 m., 11.xii.1948, sta. 1019, leg. PWH.— Boca Lagoen, N side: 1 juv. ♂, 1 ovig. ♀ (RMNH D 7959), 7 juv. ♂♂, 1 juv. ♀ (RMNH D 36837), steep limestone cliff, 0-1.5 m., 13.xi.1948, sta. 1020, leg. PWH; 7 juv. ♂♂, 9 ♀♀ (8 juv., 1 ovig.) (RMNH D 7960), rocky beach with small tide pools, 0-0.5 m., 13.xi.1948, sta. 1020A, leg. PWH; 1 ♂ (RMNH D 7946), sandy beach with pebbles, 0-0.25 m., 13.xi.1948, sta. 1020B, leg. PWH.— Boca Santoe Pretoe (Boca Chikite): 1 juv. ♀ (RMNH D 7961), rocky beach with *Dictyonema*, quartzite pebbles, 0.5-1.5 m., 12.iii.1949, sta. 1022, leg. PWH.— Playa Hoeloe (Playa Hulu): 13 ♂♂ (5 juv.), 20 ♀♀ (10 juv., 10 ovig.) (RMNH D 7968), sandy reef, *Acropora cervicornis* and *Porites*, 0.5-1.5 m., 28.x.1948, sta. 1023, leg. PWH; 1 juv. ♂, 1 juv. ♀ (RMNH D 7943), S cliff with sandy reef, 0-1 m., 2.iv.1949, sta. 1024, leg. PWH.— Plaja Frankie, near Spaanse Put Baai: 6 ♂♂ (1 juv.), 1 ovig. ♀ (RMNH D 36814), limestone shore with sandy beach, 0-1 m., 27.ii.1955, sta. 1317, leg. PWH; 2 ♂♂, 1 ovig. ♀ (RMNH D 36806), shallow lagoon with sandy reef debris, 0-1 m., 27.ii.1955, sta. 1318, leg. PWH.— Groot Santa Martha: 1 juv. ♂ (RMNH D 36794), between corals debris at inner bay shore (barak), 12.iv.1955, leg. B. de Jong.— Santa Martha Baai, entrance, near St. Nikolaas 12 ♂♂ (9 juv.), 11 ♀♀ (10 juv., 1 ovig.) (RMNH D 36881), under rocks,

3.ii.1957, sta. 1083 leg. LBH.— Bullenbaai: 3 ♂♂ (2 juv.), 4 ♀♀ (2 juv., 2 ovig.) (RMNH D 7417), 1950-1951, leg. C. J. v.d. Meer.— Bay NW of Piscadera Baai: 5 ♂♂ (2 juv.) (RMNH D 36880), between corals and rocks, 3.ii.1957, sta. 1074, leg. LBH; 13 ♂♂ (3 juv.), 4 ♀♀ (3 juv.) (RMNH D 36889), at column of sea anemone, 16.iii.1957, sta. 1155, leg. LBH.— Piscadera Baai: 1 ovig. ♀ (RMNH D 21475), xii.1963-vi.1964, leg. A. M. L. van Delft.— Piscadera Baai, mouth, near Carmabi: 1 ovig. ♀ (RMNH D 36895), 4 and 5.i.1957, sta. 1040, leg. LBH.— Piscadera Baai, beach of Marie Pompoen: 38 ♂♂ (21 juv.), 32 ♀♀ (13 juv., 19 ovig.) (RMNH D 36870), coast with rocks (many broken), some with algae, 26.xii.1956, sta. 1028, leg. LBH.— Piscadera Baai, NW of entrance: 10 ♂♂ (3 juv.), 7 ♀♀ (3 juv., 1 ovig.) (RMNH D 36873), between and in rocks, *Mithraculus* often at the column of sea anemones, 23.i.1957, sta. 1060, leg. LBH; 2 ♂♂ (1 juv.), 4 ♀♀ (2 juv., 2 ovig.) (RMNH D 36879), sand with rocks, between algae, 2.i.1957, sta. 1036, leg. LBH.— Piscadera Baai, entrance: 53 ♂♂ (31 juv.), 30 ♀♀ (10 juv., 18 ovig.) (RMNH D 36871), 2 juv. ♂♂, 1 juv. ♀, (RMNH D 36891), sandy bottom or muddy sand, sometimes with rocks, in sponges, between algae, sponges, hydrooids, tunicates etc., 0-1.5 m., 12.xi-xii.1956, sta. 1002, leg. LBH; 1 juv. ♀ (RMNH D 36897), 0.25 m., 21.i.1957, sta. 1055, leg. LBH.— Piscadera Baai, Boca Piscadera (outer bay), NE part, Carmabi beach: 6 juv. ♂♂ (RMNH D 36826), 4 juv. ♂♂ (RMNH D 36853), sandy pebbles, some coral, 1-2 m., 5.i.1965, sta. 1457, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NW part: 3 juv. ♂♂, 1 juv. ♀ (RMNH D 36829), muddy sand with rock debris, 1-1.5 m., 5.i.1964, sta. 1458, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), Carmabi beach: 1 juv. ♀ (RMNH D 36858), pebbles overgrown with algae, sheet iron, rock, 0-0.5 m., 1.i.1964, sta. 1459, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), W: 3 juv. ♂♂, 1 juv. ♀ (RMNH D 36830), small sandy inlet with *Rhizophora*, *Didemnum*, and other ascidians, 0-0.5 m., 14.xii.1963, sta. 1460, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), S of water-pipe: 3 juv. ♂♂ (RMNH D 36834), sandy bottom with *Rhizophora*, distinct tidal flow, 0-1 m., 14.xii.1963, sta. 1461, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), Water-pipe: 2 juv. ♂♂, 1 ♀ (RMNH D 36859), iron supports in tidal flow, with dense *Pennaria*, *Didemnum*, *Styela* and *Microcosmus*, 0-1 m., 2.i.1964, sta. 1462, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), W side, N of water-pipe: 1 juv. ♂ (RMNH D 36831), sandy bottom with *Halimeda*, scanty *Thalassia*, 1 m., 14.xii.1963, sta. 1463A, leg. PWH.— Piscadera Baai, inner bay: 1 juv. ♀ (ZMA), on mangrove, 6.x.1958, leg. J. H. Stock.— Piscader Baai, Binnenbaai (Padang, inner bay), W side, Candelchi: 1 juv. ♀ (RMNH D 36838), rocky or sandy bottom with some mud, 1-1.5 m., 18.xii.1963, sta. 1469A, leg. PWH.— Spaanse Water, mouth, near Nieuwpoort: 3 ♂♂, 2 ovig. ♀♀ (RMNH D 36883), between algae, seagrass etc. in bay, 25.xi.1956, sta. 1013, 25.xi.1956, leg. LBH.— Spaanse Water, entrance: 2 ♂♂ (RMNH D 36890), 13.iii.1957, sta. 1152, leg. LBH.— Spaanse Water, near Santa Barbara Beach: 2 juv. ♂♂ (RMNH D 36898), undep, sand bottom and mangroves, in sponge, 18.i.1957, sta. 1054, leg. LBH; 2 juv. ♂♂, 2 ♀♀ (1 juv.) (RMNH D 36894), at night, 8 and 13.ii.1957, sta. 1092, leg. LBH.— Fuik Baai, entrance, NW spit of land: 17 ♂♂ (6 juv.), 19 ♀♀ (1 juv., 18 ovig.) (RMNH D 36872), under and between rocks, 0-1 m., 13.i.1957, sta. 1051, leg. LBH.— Fuik Baai, NW end: 4 ♂♂ (3 juv.), 5 ♀♀ (2 juv., 3 ovig.) (RMNH D 36887), lagoon, bottom pure sand with stones, algae and seagrass, shore muddy, 13.i.1957, sta. 1052, leg. LBH.— Fuik Baai, W part, Duitse Bad: 1 juv. (RMNH D 7958), *Rhizophora* in mud, several *Cassiopea*, 0-1 m., 2.iii.1949, sta. 1038A, leg. PWH.— Fuik Baai, W part, SE of Newport Bath: 6 ♂♂ (5 juv.), 6 ♀♀ (5 juv., 1 ovig.), 1 carapace (RMNH D 7942), rocky shore with muddy sand, some *Thalassia*, 0-1.5 m., 20.xi.1948, sta. 1039, leg. PWH; 1 juv. ♂ (RMNH D 36865), sandy mud with rock debris, few *Thalassia*, *Sargassum*, 1-2 m., 20.xi.1948, sta. 1039A, leg. PWH.— Awa di Oostpunt: 6 juv. ♂♂, 1 ovig. ♀ (RMNH D 36835), 30-50 m. offshore, sandy, *Thalassia* with *Porites*, 0.25-1 m., 22.ii.1970, sta. 1666A, leg. PWH.— St. Joris Baai, entrance, N side: 1 ♀ (RMNH D 36812), 1 ♂, 1 ovig. ♀ (RMNH D 36844), rocky cliff with debris, 250 m. from sea, scanty *Thalassia*, 0-1.5 m., 20.ii.1955, sta. 1354, leg. PWH.— Boca Bartool, S side of entrance: 5 ♂♂ (3 juv.), 15 ♀♀ (5 juv., 10 ovig.) (RMNH D 36810), limestone and muddy sand with much *Halimeda* and scanty *Thalassia*, 0-1.5 m., 12.ii.1955, sta. 1361, leg. J. S. Zaneveld (Hummelinck).— Santa Cruz Baai: 2 juv. ♀♀ (ZMA), 23.iv.1930, leg. PWH.— Santa Cruz Baai, NW: 11 juv. ♂♂, 5 juv. ♀♀ (RMNH D 36896), sandy beach with rocks and a diabas ridge with algae, 13.xii.1956, sta. 1021, leg. LBH.— Blauwe Baai: 1 ♂, 1 ovig. ♀ (RMNH D 26795), 29.vii.1956. Klein Curaçao.— W shore: 1 juv. ♂ (RMNH D 36850), sandy beach with some limestone rock, *Sargassum*, 0-1 m., 1.x.1948, sta. 1046, leg. PWH. Bonaire.— E coast: 1 ♂ (RMNH D 30360), on abrasion platform with shallow water and some deeper holes, commensal on *Bunodosoma granuliferum*, 13.iv.1973, leg. J. C. den Hartog.— In front of Gotomeer: 1 ♂, 2 ♀♀ (RMNH D 30361), found between *Acropora palmata* (Lamarck) fringe and stony beach, commensals of *Stichodactyla helianthus* (Ellis), iv.1973, leg. J. C. den Hartog.— Beach near Paloe Lechi, N of Kralendijk: 19 ♂♂ (17 juv.), 7 juv. ♀♀ (RMNH D 36886), coast with coralridges, pools with algae, sea anemones etc., beach with rocks, 5.iii.1957, sta. 1137, leg. LBH.— Paloe Lechi (Playa Lechi), overflow

of Salinja: 5 ♂♂ (4 juv.), 4 ♀♀ (2 juv., 2 ovig.) (RMNH D 7953), rocky beach with coral debris, beachrock and muddy sand, 0.5-1.5 m., 4.ix.1948, sta. 1055, leg. PWH.— Paloe Lechi (Playa Lechi), S of Salinja: 1 ♂ (RMNH D 7962), rocky beach with small tide pools, 0-0.25 m., 24.ii.1949, sta. 1056A, leg. PWH; 1 juv. ♂ (RMNH D 7951), sandy reef, 1-2.5 m., 4.ix.1948, sta. 1056C, leg. PWH; 5 ♂♂ (4 juv.), 1 juv. ♀ (RMNH D 7966), rocky beach with some sand, 0.25-1 m., 4.ix.1948, sta. 1056B, leg. PWH.— Kralendijk: 2 juv. ♂♂, 1 juv. ♀ (ZMA), 26.x.1930, leg. PWH; 3 juv. ♂♂, 3 juv. ♀♀ (ZMA), overgrown low chalkcoast, 19.ix.1930, leg. PWH; 2 juv. ♀♀ (ZMA), along the shore of low coralcoast, 16.ix.1930, leg. PWH.— Kralendijk, near Pasangrahan: 4 juv. ♂♂, 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 7957), rocky beach with some sand, 0.5-1.5 m., 20.ix.1948, sta. 1057C, leg. PWH.— Passangrahan: 9 juv. ♂♂, 6 juv. ♀♀ (ZMA), 5.ix.1930, leg. PWH.— De Hoop: 2 juv. ♂♂, 4 ♀♀ (1 juv., 2 ovig.) (ZMA), 30.x.1930, leg. PWH; 1 ovig. ♀ (ZMA), 6.xi.1930, leg. PWH; 1 juv. ♂, 1 juv. ♀ (ZMA); 1 juv. ♂, 1 juv. ♀ (ZMA), 11.xi.1930, leg. PWH.— Punt vierkant, N side: 2 juv. ♂♂, 3 ♀♀ (2 juv., 1 ovig.) (RMNH D 7945), surf notches with coarse rock debris *Turbinaria* and *Sargassum*, 0.25-1 m., 9.ix.1948, sta. 1059A, leg. PWH; 1 juv. ♀ (ZMA), 2.x.1930, leg. PWH.— Lagoen: 1 juv. ♂ (ZMA), on roots of *Rhizophora*, 2.xi.1930, leg. PWH.— E, N of Lac: 3 juv. ♂♂ (RMNH D 36892), narrow lagoon, sandy and muddy coasts, by mouth rocks with algae, 9.iii.1957, sta. 1145, leg. LBH.— Lac, E: 1 juv. ♀ (RMNH D 36882), lagoon in between mangroves, in seagrass and between algae at landside, 6.iii.1957, sta. 1138, leg. LBH.— Lac, entrance: 1 juv. ♂, 1 juv. ♀ (ZMA), 5.x.1930, leg. PWH; 1 juv. ♂, 1 juv. ♀ (ZMA), 26.x.1930, leg. PWH; 2 ovig. ♀♀ (ZMA), 5.x.1930, leg. PWH.— Lac, near E point of Cai, boca behind reef: 1 juv. ♀ (RMNH D 7964), sandy reef with much *Acropora*, 1-2 m., 1.x.1948, sta. 1068a, leg. PWH. Lac, Sorobon (Soerebon) Point: 2 ♂♂, 6 ovig. ♀♀ (RMNH D 36817), limestone with sandy debris, (20.3-20.5-21.5 g Cl/1), 0-0.5 m., 17.iv.1955, sta. 1373, leg. PWH.— Lac, N of Sorobon Point: 13 ♂♂ (1 juv.), 18 ♀♀ (1 juv., 17 ovig.) (RMNH D 36803), 3 ♂♂, 2 ovig. ♀♀ (RMNH D 36813), 2 juv. ♂♂, 1 ovig. ♀ (RMNH D 36843), 3 ♂♂, 6 ovig. ♀♀ (RMNH D 36868), 6 ♂♂, 10 ♀♀ (1 juv., 9 ovig.) (RMNH D 36815), *Porites* with *Thalassia*, *Lithothamnium*, 0.25-0.5 m., 17.iv.1955, sta. 1373A, leg. PWH.— Sorobon: 3 ♂♂, 1 ♀ (RMNH D 36804), 24.ix.1968, leg. PWH.— Lac, entrance, Secu di Sorobon, 100 m. N of Sorobon Point: 1 ♂, 1 ovig. ♀ (RMNH D 36811), 1 juv. ♀ (RMNH D 36860), sandy *Lithothamnium* ridge, some *Thalassia*, *Tripneustes*, 0.25-1 m., 21.viii.1967, sta. 1565, leg. PWH.— Boca Washikemba: 1 juv. ♂ (RMNH D 36863), beachrock with pools, limestone, 0-1 m., 7.iv.1955, sta. 1375, leg. PWH.— Lagoen, S shore: 2 juv. ♀♀ (RMNH D 36861), rock debris, *Rhizophora*, some *Thalassia*, 0-1 m., 9.iv.1955, sta. 1070c, leg. PWH. Lagoen, N shore, central part: 2 juv. ♂♂, 3 ♀♀ (2 juv.) (RMNH D 36805), diabase rock near sandy beach with debris, some *Thalassia*, 0-1 m., 2.iv.1955, sta. 1377, leg. PWH.— Boca Onima: 7 juv. ♂♂, 12 juv. ♀♀ (RMNH D 7947), sandy limestone debris insurf, with *Sargassum*, 0.5-1 m., 19.ix.1948, sta. 1071A, leg. PWH.— W coast of S part, near Pan of Pekelmeer: 7 ♂♂ (5 juv.), 1 juv. ♀ (RMNH D 36901), coral debris with pools and algae, 7.iii.1957, sta. 1139, leg. LBH. Klein Bonaire.— E coast at Landing: 13 ♂♂ (12 juv.), 14 ♀♀ (10 juv., 4 ovig.) (RMNH D 7967), reef debris on sandy beach, 0-1.5 m., 13.ix.1948, sta. 1049B, leg. PWH.— W coast, W Point: 2 juv. ♂♂, 5 ♀♀ (1 juv., 4 ovig.) (RMNH D 36818), beachrock with sandy reef, 0-1 m., 28.iii.1955, sta. 1367, leg. PWH.— N coast, ENE: 9 ♂♂ (1 juv.), 6 ♀♀ (2 juv., 3 ovig.) (RMNH D 36821), 2 juv. ♂♂, 1 juv. ♀ (RMNH D 36825), shallow limestone flat with pools and fissures with sand, 0-0.5 m., 13.iv.1955, sta. 1371, leg. PWH.— E shore: 1 juv. ♀ (ZMA), 10.ix.1930, leg. PWH; 8 ♂♂, (1 juv.) 3 juv. ♀♀ (ZMA), sandy bottom, leg. PWH. Islote Aves.— 8 ♂♂, 20 ♀♀ (1 juv.) (RMNH D 36797), 18-23.v.1956, leg. J. S. Zaneveld; 2 ♂♂, 1 carapace (RMNH D 7965), 12.v.1949, leg. PWH.— Northern Lagoon: 10 ♂♂ (9 juv.), 2 juv. ♀♀ (RMNH D 7963), sandy shore with some debris of coral and beachrock, 0-1 m., 12.v.1949, sta. 1114, leg. PWH; 7 ♂♂ (6 juv.), 5 juv. ♀♀ (RMNH D 7948), sandy coral debris, 0.5-1.5 m., 12.v.1949, sta. 1114A, leg. PWH. Grenada.— White Bay, Point Salines: 2 ♂♂ (1 juv.), 3 ♀♀ (2 juv., 1 ovig.) (RMNH D 36820), beachrock on sand beach, pools with some *Thalassia* and *Syringodium*, 0-1 m., 26.i.1955, sta. 1389, leg. PWH. Trinidad.— Monos Island, Avalon Bay: 2 ♀♀ (1 ovig.) (RMNH D 36856), metamorphic, large pebbles and some coarse sand, 0.5-1.5 m., 10.i.1955, sta. 1382, leg. PWH.— Point Ground, near Police station: 6 ♀♀ (1 juv., 5 ovig.) (RMNH D 24188), between *Acropora* near the shore, 26.ix.1965, leg. H. O. von Hagen. Tobago.— 2 ♂♂, 2 ♀♀ (1 juv.) (ZMC), iv and 1.xii.1916, leg. Th. Mortensen, ZMC; Buccoo Reef: 1 ♂, 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 36819), *Porites*-flat with *Acropora*, 0.5-1 m., 16.i.1955, sta. 1387, leg. PWH.— Buccoo Bay, near Hamlet: 1 ♂, 1 ovig. ♀ (RMNH D 36809), sandy bottom with scattered *Acropora* and other corals, *Halimeda*, 2-2.5 m., 16.i.1955, sta. 1385, leg. PWH. Mixed sample.— 1 ♂, 4 ♀♀ (1 juv., 2 ovig.) (ZMA), Vera Cruz (Mexico) and St. John, leg. Liebmann and Ørsted.

Description.— The carapace is definitely broader than long, rather convex and the branchial sulci on its surface are not broken up by transverse grooves. The ros-



Figs. 40-43. *Mithraculus coryphe* (Herbst, 1801): 40. dorsal view of the animal (after Velez, 1977), 10 mm indicated; 41. right basal antennal segment (RMNH D 36813), 1 mm indicated; 42. carpus of the right cheliped (RMNH D 36813), 2 mm indicated; 43. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 36813), 1 mm indicated.

trum is little advanced, incised by a narrow notch. The basal antennal segment is subtriangular and has two lobiform spines of which the second, placed on the antero-external angle, is four times as large as the first. The first is situated anterior at the base of the second. The antennae are 0.2 times as long as the carapace. The orbit is armed with one lobe below (not counting the basal antennal spines) and two lobes above. These two lobes are the preorbital and the postorbital lobe. The carapace has three anterolateral lobes, increasing in size posteriorly.

The chelipeds of the male are much stouter and more than 1.5 times as long as the first pair of ambulatory legs; the merus is triangular in transverse section and has two lobes on the inner upper margin, four lobes on the outer upper margin and two tubercles in between; the carpus is nodose with two tubercles on the inner upper

margin; the palm is smooth and compressed; the fingers have a long and broad gape, only the spooned tips are crenulate, a large tooth is present at one third of the gape on the cutting edge of the dactylus and another large tooth is present at two thirds of the gape on the cutting edge of the propodus. In the females the fingers gape less and are without teeth. On the inner margin of the spooned tips of both fingers there are two bundles of hairs. The first pair of ambulatory legs are 1.25 times as long as the carapace (including the rostrum). The ambulatory legs are covered with a brush-like coating of stout and slender setae. Minute spines are present in the middle of the upper border of the merus, carpus and propodus. The merus of the first two pairs of ambulatory legs is armed below with two tubercles.

The male gonopod is long, stout and straight. It is dorsoventrally flattened, and distally abruptly narrowed, broadens again and after a very small lobe tapers quickly to a rather sharp pointed tip at the outer margin. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal is an adult male of 17.9 mm long (including the rostrum) and 27.1 mm wide (including the lobes) (RMNH D 36813).

Colour.— "Very prettily and finely mottled green and white. Underside chiefly white. Lower part of the chelipeds white. Dactylus of the legs salmon pink with white tips" (Rathbun, 1925). All the spirit specimens at my disposal showed the colour as in Rathbun's description.

Remarks.— The only species that can be confused with the present is *Mithraculus sculptus* (Lamarck, 1818). Both species have blunt anterolateral lobes, and both are green in colour. Generally *M. sculptus* is dark olive-green, while *M. coryphe* is much lighter in colour. In juvenile spirit specimens of the two species there is almost no difference in colour. Besides the shape of the basal antennal segment, the best character to distinguish these two species is the number of anterolateral lobes. *M. coryphe* has always three anterolateral lobes, while *M. sculptus* has four. Other characters in which the species differ are not distinct in juveniles. Juveniles of both species are about as long as broad, the transverse grooves on the branchial sulci are not yet distinct in *M. sculptus*, and the carapace of both species appears to be of the same convexity. As in *M. cinctimanus*, many individuals of this species seem to be associated with certain species of sea anemones and sponges. In the literature the species is reported to be associated with corals (Rathbun, 1925), sea anemones (Rathbun, 1921) and sponges (Powers, 1977). Part of the material examined was found associated with the corals *Acropora* spec., *Acropora palmata* (Lamarck), *Acropora cervicornis* (Dana), *Porites* spec., the serpulid worm *Fragmentopoma* spec., and the sea anemones *Bunodosoma granuliferum* (Lesueur), and *Stichodactyla helianthus* (Ellis).

Distribution.— The species is previously reported in literature from the following localities: Florida U.S.A., (Stimpson, 1860, 1871; Kingsley, 1880; Rathbun, 1892, 1898, 1901, 1925), Gulf of Mexico (Powers, 1977), Bahamas (Rathbun, 1892, 1898, 1901, 1925; Nutting, 1895; Rankin, 1898, 1910; Garth, 1978), West Indies (White, 1847), Antilles (Herklotz, 1861), New Providence Island (Rankin, 1898, 1910), Old Providence Island (Schmidt, 1939), Cuba (Stimpson, 1871; Rankin, 1898, 1910; Rathbun, 1925; Gomez & Ortiz, 1976), Jamaica (Benedict, 1892; Rathbun, 1892, 1897, 1925), Dominican Republic (Bonelli de Calventi, 1974), Puerto Rico (Rathbun, 1901,

1925), St. Thomas (Rathbun, 1892, 1925; Rankin, 1898, 1910), Antiqua (Rathbun, 1921, 1925), Barbados (Rathbun, 1921, 1925; Jones, 1969), Panama (Stimpson, 1860; Streets, 1871; Rathbun, 1925), Colombia (Rathbun, 1925; Vélez, 1977; Scotto & Gore, 1980), St. Barts (Aurivillius, 1889), Guadeloupe (Desbonne & Schramm, 1867 (1914); Rankin, 1898, 1910), Curaçao (Rathbun, 1925), Venezuela (Chace, 1956; Rodriguez, 1980), and Brazil (Smith, 1869; Miers, 1886; Pocock, 1890; Rathbun, 1892, 1898a, 1900a, 1901, 1925; Moreira, 1901; Coêlho & Ramos, 1972; Fausto, 1974).

Mithraculus sculptus (Lamarck, 1818)
(figs. 44-47)

Araneus marinus Seba, 1759: 49, pl. 19 figs. 22, 23.

Maia sculpta Lamarck, 1818: 242; Lamarck, 1838: 436.

Mithrax sculptus; H. Milne Edwards, 1832: 12, pl. 5; Gibbes, 1850: 172; Guérin-Méneville, 1856: 11; Guérin-Méneville, 1857: 26; von Martens, 1872: 83; Miers, 1886: 87; Gundlach, 1887: 118; Benedict, 1892: 77; Rathbun, 1892: 271; Nobile, 1897: 1; Rathbun, 1897: 11; Rankin, 1898: 235; Rathbun, 1898: 260; Doflein, 1899: 179; Torralbas, 1900 (reprinted in 1917, Habana): 17, fig. 9; Moreira, 1901: 63; Rathbun, 1901: 71; Rankin, 1910: 79; Rathbun, 1919: 345; Rathbun, 1924: 20; Pearse, 1932: 109; Schmidt, 1939: 29; Glynn, 1964: 43; Hartnoll, 1965: 1-16, figs. 1a-b; Fausto, 1967: 12; Jones, 1969: 382; Voss, 1976: 118, 119 fig.; Colin, 1978: 367; Hazlett, 1979: 576; Rodriguez, 1980: 288, pl. 23; Abele & Kim, 1986: 528, 529 fig. b.

Mithrax coronatus; White, 1847: 7 (part) (not Molina, 1782, nor Herbst, 1785).

Mithrax minutes de Saussure, 1858: 425, pl. 1 fig. 1; de Saussure, 1858a: 9; Desbonne & Schramm, 1867 (Reprinted in 1914, Berlin): 10.

Mithraculus sculptus; Stimpson, 1871: 117; A. Milne Edwards, 1880: 2; Aurivillius, 1889: 58; Ives, 1891: 189; Kendall, 1891: 303; A. Milne Edwards & Bouvier, 1923: 391.

Mithrax (*Mithraculus*) *sculptus*; Miers, 1879: 667; Rathbun, 1921: 84; Rathbun, 1925: 422, pl. 152, text-figs. 125, 126; Chace, 1956: 161; Coêlho & Ramos, 1972: 215; Bonelly de Calventi, 1974: 25; Fausto, 1974: 17; Gomez & Ortiz, 1976: 16; Powers, 1977: 56; Vélez, 1977: 130, fig. 19; Garth, 1978: 331.

Mithrax (*Mithrax*) *sculptus*; Young, 1900: 94.

Mithrax (*Mithraculus*) *forceps*; Boone, 1930: 100, pl. 30 fig. B (not A. Milne Edwards, 1875).

Material.— U.S.A., Florida.— 1 ♂ (ZMC), 1860.— Tortugas: 21 ♂♂ (10 juv.), 25 ♀♀ (6 juv., 12 ovig.) (RMNH D 4918), vii.1925, leg. H. Boschma.— Lower Matacumbe Key: 2 ♂♂, 1 ovig. ♀♀ (RMNH D 27745), between calcareous algae, 0.5-1 m., 30.v.1967, leg. LBH.— Pigeon Key: 1 juv. ♂, 3 ♀♀ (2 juv.), 30.i.1965, leg. LBH.— Miami, Virginia Key, NE side: 3 juv. ♀♀ (RMNH D 36974), sandflat with *Syringodium* and *Thalassia* beds, 0.5-1.5 m., 4.ix.1963, sta. 1408, leg. PWH; 6 ♂♂ (1 juv.), 3 ♀♀ (2 juv.) (RMNH D 36962), seagrass with pieces of coral and concrete, 1-2 m., 4.ix.1963, sta. 1408A, leg. PWH.— N point Virginia Key, Norris Cut: 2 ♂♂, 1 ♀ (RMNH D 27744), 0-0.5 m., 12.i.1971, leg. LBH.— Key Biscayne, NE tip of Key: 1 juv. ♂, 3 juv. ♀♀ (RMNH D 36967), sandy beach with mangroverock, tide pools with *Zoanthus* and *Tetraclita*, *Thalassia* and *Halodule*, 0-1 m., 7.ix.1963, sta. 1411, leg. PWH.— Key Biscayne, S point: 1 juv. ♂, 2 juv. ♀♀ (RMNH D 26947), 1 juv. ♀ (RMNH D 36956), from *Fragmentopoma*, 22.viii.1969, leg. LBH.— Key Biscayne, N point at Bear Cut: 2 ♀♀ (1 ovig.) (RMNH D 36966), sandflat with dense *Syringodium* and *Thalassia*, 0.5-1.5 m., 1.ix.1963, sta. 1410, leg. PWH.— Key Biscayne, Bear Cut: 14 ♂♂ (4 juv.), 21 ♀♀ (5 juv., 16 ovig.) (RMNH D 36936), 9-20.xii.1964, leg. LBH; 46 ♂♂ (27 juv.), 63 ♀♀ (28 juv., 33 ovig.) (RMNH D 36937), 1-10.i.1965, leg. LBH; 37 ♂♂ (19 juv.), 34 ♀♀ (22 juv., 6 ovig.) (RMNH D 36940), 7.ii.1965, leg. LBH; 13 ♂♂ (1 juv.), 15 ♀♀ (1 juv., 7 ovig.) (RMNH D 36941), 5.vii.1968, leg. LBH; 1 ♂ (RMNH D 36948), 19-20.xii.1964, leg. LBH; 4 ♂♂ (3 juv.), 6 ♀♀ (5 juv., 1 ovig.) (RMNH D 36949), 20.viii.1970, leg. LBH; 1 juv. ♂ (RMNH D 36951), 7.ii.1965, leg. LBH; 1 ovig. ♀ (RMNH D 36957), 16.viii.1968, leg. LBH; 4 ♂♂, 3 juv. ♀♀ (RMNH D 36960), 12.viii.1968, leg. LBH; 3 ovig. ♀♀ (RMNH D 37058), 0-1 m., 6.iii.1974, leg. R. Work & LBH; 1 ♂, 1 juv. ♀ (RMNH D 36935), under rocks, 0-1 m., 7.vi.1967, leg. LBH; 6 ♂♂ (3 juv.), 8 ♀♀ (6 juv.) (RMNH D 36944), sea grass and sponges, 0-1 m., 27.vii.1966, leg. LBH; 10 ♂♂ (4 juv.), 14 ♀♀ (10 juv., 3 ovig.) (RMNH D 36945), 0-1

m., 6.viii.1966; 8 ♂♂ (2 juv.), 5 ♀♀ (2 juv., 2 ovig.) (RMNH D 36946), 0-1 m., 18.viii.1966, leg. LBH; 3 ♂♂ (2 juv.), 1 ovig. ♀ (RMNH D 36950), collected at night, 10.i.1965, leg. LBH; 1 juv. ♂ (RMNH D 36953), seagrass and sponges, 1 m., 27.vii.1966, leg. LBH; 1 juv. ♂, 1 juv. ♀ (RMNH D 36954), 0-1 m., 6.viii.1966, leg. LBH; 1 ovig. ♀ (RMNH D 36955), 0-2 m., 16.i.1965, leg. LBH; 3 ♂♂ (2 juv.), 2 juv. ♀♀ (RMNH D 36959), seagrass, serpulids, 0-1 m., 3.viii.1966, leg. LBH; 29 ♂♂ (10 juv.), 30 ♀♀ (15 juv., 9 ovig.) (RMNH D 36938), shore, between seagrass and algae, 0-1 m., 1-9.ix.1963, leg. LBH; 3 ♂♂ (2 juv.), 2 juv. ♀♀ (RMNH D 36958), between seagrass and algae, 0-1.5 m., 2-9.ix.1963, leg. LBH.

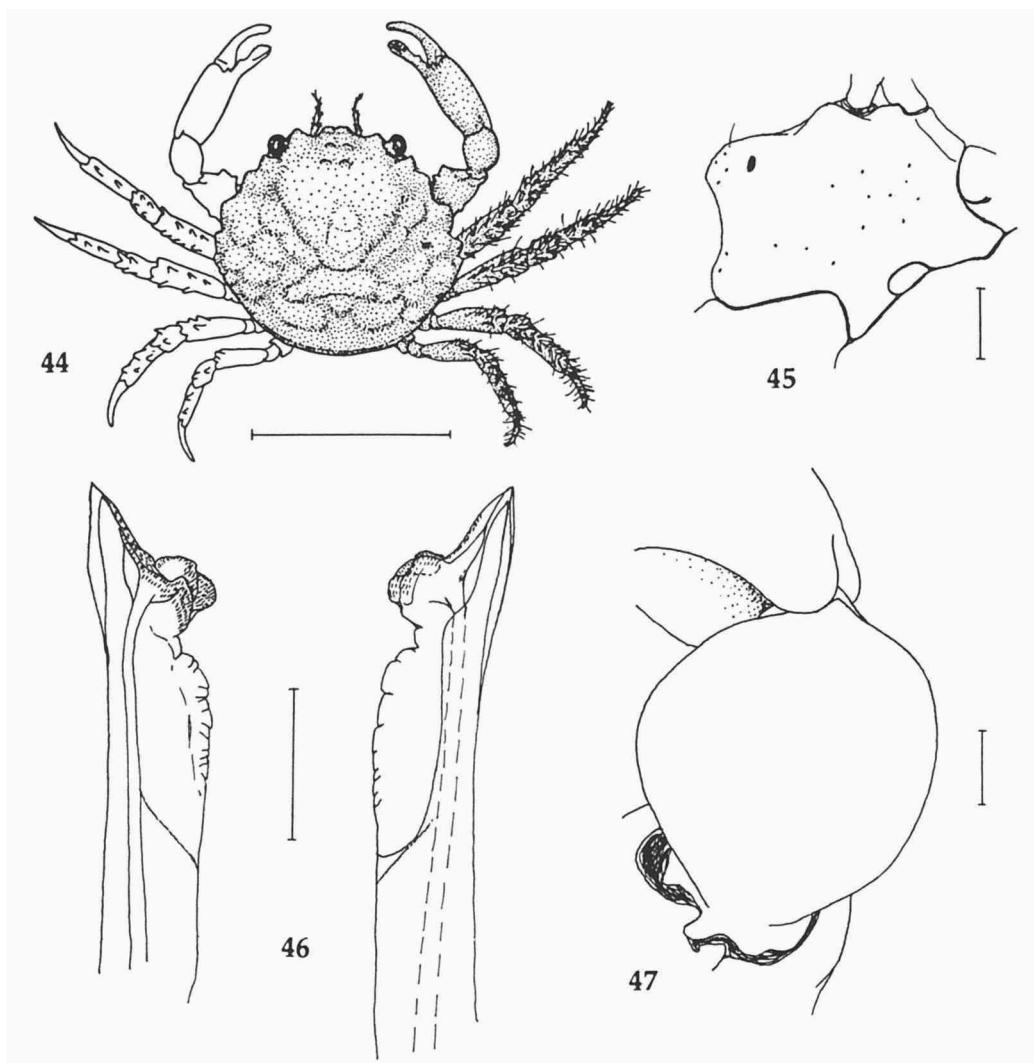
Antilles.— 1 ♂ (MP B-455), 1826, leg. Plée. **Jamaica.**— 1 juv. ♀ (SMF 9098), 1904, leg. Reichardt.

Hispaniola, Dominican Republic.— Prov. Azua, Bay of Puerto Viejo: 1 ♂, on *Mithrax* -cage, among algae, 0-1.5 m., 19.i.1988, H. P. Wagner (pers. obs.). **Puerto Rico.**— Mata de la Gata reef, SE of Maueyes: 8 ♂♂ (2 juv.), 6 ♀♀ (2 juv., 1 ovig.) (RMNH D 36938), poor *Rhizophora*, scanty *Thalassia* on muddy beach with old jetty, 0-1 m., 12.ix.1963, sta. 1419, leg. PWH; 1 ♂, 1 ovig. ♀ (RMNH D 36970), *Porites*-flat with some *Thalassia* and *Halimeda*, 0.25-1 m., 10.iii.1970, sta. 1419A, leg. PWH. **St. Thomas.**— 42 ♂♂, 15 ♀♀ (6 juv., 6 ovig.) (ZMC), leg. Riise; 1 ♂ (MP B-455), don. Fabricius?; 1 ♂ (MP B-20872), leg. A. Milne Edwards. **St. John.**— Coral Bay: 1 ♂ (ZMC), leg. Chr. Levinse. **St. Croix.**— St. Princess: 2 ♂♂ (1 juv.), 1 ovig. ♀ (ZMC), leg. Chr. Levinse. **Anguilla.**— N of Sandy Ground: 2 juv. ♂♂, 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 7918), beachrock with sandy reef, 0-1.5 m., 19.vi.1949, sta. 1142, leg. PWH. **St. Maarten.**— Great Bay coast, near Philipsburg: 4 ♂♂ (2 juv.), 5 ♀♀ (2 juv., 3 ovig.) (RMNH D 36983), between stones and algae on stones at beach, 16-17.ii.1957, sta. 1111, leg. LBH.— Great Bay, Point Blanche Bay, NE shore: 3 ♂♂, 1 ovig. ♀ (RMNH D 7927), rocky beach with sandy debris, some *Thalassia*, 0.5-1 m., 16.v.1949, sta. 1127, leg. PWH.— Oysterpond: 74 ♂♂ (31 juv.), 108 ♀♀ (49 juv., 48 ovig.) (RMNH D 36939), 0.3-0.6 m., 22.vii.1984, leg. P. A. van den Heuvel; 34 ♂♂ (18 juv.), 57 ♀♀ (29 juv., 23 ovig.) (RMNH D 35971), 0-3 m., 30.vii.1983, leg. P. A. van den Heuvel. **St. Eustatius.**— Gallows Bay, E of Oranjestad, 3 ♂♂ (2 juv.), 1 ovig. ♀ (RMNH D 36979), beach with rocks and ruins, overgrown with brown algae, 28.ii.1957, sta. 1133, leg. LBH. **Guadeloupe.**— 1 ♂ (MP B-482, holotype *Mithrax minutus* de Saussure), don. H. de Saussure; 1 ♂ (MP B-4563), leg. A. Milne Edwards; 1 ♂, 1 ♀, 1 carapace (MP B-18812), collection I. Desbonne. **Martinique.**— 3 ♂♂ (1 juv.) (MP B-457), leg. Rousseau. **Honduras.**— Utille: 1 ♂ (SMF 2092), 27.ix.1951, leg. H. Peters; 9 ♂♂ (2 juv.), 7 ♀♀ (2 juv., 3 ovig.) (SMF 10971 part). **Panama.**— Colon (Limon Bay): 1 ♀ (RMNH D 36932), 9 21°N 79 57'W, Night Light Dip Net, 4.vii.1966, Pillsbury sta. 319. **Colombia.**— Dept. Bolívar, S. of Cartagena, Islas del Rosario, Isla Grande, Punta Arenas, near Barbares: 2 ♂♂ (SMF 9948), low tide, under stones, 21.x.1978, leg. D. Rodriguez.— Dept. Magdalena, vicinity of Santa Marta: 1 ♂ (SMF 7364), leg. M. Vélez.— Santa Marta: 1 ♂, 3 ♀♀ (1 juv., 2 ovig.) (SMF 9087), 28.i.1976, leg. M. Vélez.— Tyrona Parc, Bahía de Chengue, Playa oriental: 2 ♂♂ (1 juv.) (SMF), under stones, 3.v.1986, leg. HGM.— Nenguangue Bight: 2 ♂♂, 1 ovig. ♀ (SMF 6862), on mud in mangrove, -xii.1974, leg. Schmalfuss. **Curaçao.**— Rifwater: 1 ♀ (RMNH D 2266), dredge, 0.5 fathom (= 0.915 m.), 6.iii.1905, J. Boeke.— Boca Grandi: 1 ovig. ♀ (ZMA), 28.vi.1930, leg. PWH.— Plaja Hoeloe (Playa Hulu): 13 ♂♂ (5 juv.), 18 ♀♀ (9 juv., 8 ovig.) (RMNH D 7929), sandy reef, *Acropora cervicornis* and *Porites*, 0.5-1.5 m., 28.x.1948, sta. 1023, leg. PWH; 1 ♀ (RMNH D 7926), sandy reef with debris, 0.25-1 m., 19.iii.1949, sta. 1023a, leg. PWH; 1 juv. ♂, 2 juv. ♀♀ (RMNH D 36972), rocky shore with sand, 0-0.5 m., 19.iii.1949, sta. 1023A, leg. PWH.— 5 ♂♂ (2 juv.), 4 ♀♀ (1 juv., 3 ovig.) (RMNH D 36961), Plaja Frankie, near Spaanse Put Baai, shallow lagoon with sandy reef debris, 0-1 m., 27.ii.1955, sta. 1318, leg. PWH.— Groot Santa Martha: 1 juv. ♀ (RMNH D 36933), between coraldebris at shore of inner bay (barak), 12.iv.1955, leg. B. de Jong.— Santa Martha Bay, entrance, near St. Nicolaas: 1 ♂ (RMNH D 36978), from coral blocks, 4.ii.1957, sta. 1083, leg. LBH.— Porto Marie Baai: 1 juv. ♀ (RMNH D 7925), rocky shore with sandy reef, *Acropora cervicornis*, 0-1.5 m., 15 and 17.iv.1930, sta. 1027, leg. PWH.— Bullenbaai: 1 juv. ♀ (RMNH D 7920), 1950-1951, C. J. v.d. Meer.— Piscadera Baai: 1 ♀ (RMNH D 36942), -ix.1957, leg. J. S. Zaneveld.— Piscadera Baai, Boca Piscadera (outer bay), NW part: 1 juv. ♂, 1 juv. ♀ (RMNH D 36971), muddy sand with rock debris, 1-1.5 m., 5.i.1964, sta. 1458, leg. PWH.— Piscadera Baai, entrance, near Willemstad: 11 ♂♂ (3 juv.), 11 ♀♀ (5 juv., 4 ovig.) (RMNH D 36984), sandy bottom or muddy sand, with rocks, on sponges, between algae, sponges, hydroids, tunicates etc., 0-1.5 m., 12.xi-xii.1956, sta. 1002, leg. LBH.— Piscadera Baai, entrance, NW: 1 ovig. ♀ (RMNH D 26990), at column of sea anemone, between and in rocks, 23.i.1957, sta. 1060, leg. LBH.— Piscadera Baai, Boca Stroink (entrance), W: 1 juv. ♂ (RMNH D 36976), small sandy inlet with *Rhizophora*, *Didemnum* and other ascidians, 0-0.5 m., 14.xii.1963, sta. 1460, leg. PWH; 1 juv. ♂, 1 juv. ♀ (RMNH D 36973), sand with leaf decay and *Halimeda*, some *Thalassia*, 0.5 m., 14.xii.1963, sta. 1460A, leg. PWH.— Spaanse Water, mouth, Santa Barbara Beach, near Nieuwpoort: 2 ♂♂ (1 juv.), 1 juv. ♀ (RMNH D 36988), between *Zostera*, at night, 8 and 13.ii.1957, sta. 1092, leg. LBH; 2 ♂♂ (1 juv.), 1 ovig. ♀ (RMNH D 36989),

between algae, 25.xi.1956, sta. 1013, leg. LBH.— Fuik Baai, NW end: 1 ovig, ♀ (RMNH D 36981), lagune with clear sand, rocks, algae, somewhat muddy at shore, 0-0.5 m., 13.i.1957, sta. 1052, leg. LBH.— Caracas Baai: 2 ♂♂, 1 juv. ♀ (ZMA), 19.iv.or 13.v.1920, coll. C.J. van der Horst. Bonaire.— Paloe Lechi (Playa Lechi), overflow of Salinja: 2 juv. ♂♂ (RMNH D 7923), rocky beach with coral debris, beachrock and muddy sand, 0.5-1.5 m., 4.ix.1948, sta. 1055, leg. PWH.— Kralendijk: 3 juv. ♂♂ (ZMA), 30.x.1930, leg. PWH.— Near De Hoop, S of Kralendijk: 1 juv. ♂, 1 juv. ♀ (RMNH D 7922), sandy reef, 1-3 m., 10.ix.1948, sta. 1058C, leg. PWH.— Lac, in lagune at landside: 3 ♂♂ (1 juv.), 2 ovig. ♀♀ (RMNH D 36985) between algae, 6.iii.1957, sta. 1138, leg. LBH.— Lac, entrance, near E point of Cai: 1 juv. ♀, sandflat with *Thalassia*, 1.5-2 m., 17.ix.1948, sta. 1067, leg. PWH. Lac, entrance, N of Sorobon Point: 1 juv. ♀ (RMNH D 36975), *Porites* with *Thalassia*, *Lithothamnium*, 0.25-0.5 m., 17.iv.1955, sta. 1373A, leg. PWH.— Lac, Sorobon (Soerebon), south part of bassin, near Boca Jewfish: 1 ♂ (RMNH D 36969), muddy sand with *Thalassia* and *Halimeda*, 0.25-1 m., 10.iii.1970, sta. 1653A, leg. PWH.— Lac, entrance, Boca behind reef, Bao di Dam, 500 m. SW of Cai: 2 ♂♂ (1 juv.), 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 36965), among *Acropora cervicornis*, 1 m., 25.viii.1967, sta. 1562, leg. PWH.— Lagoen, S shore: 1 juv. ♂ (RMNH D 7921), diabase rock with muddy sand, *Rhizophora* with *Cithamalus*, 0.5-1.5 m., 14.ix.1948, sta. 1070A, leg. PWH.— Eastern coast: 2 juv. ♂♂, 1 juv. ♀ (ZMA), 10.ix.1930, leg. PWH. Klein Bonaire.— E coast at Landing: 2 juv. ♂♂ (RMNH 7924), reef debris on sandy beach, 0-1.5 m., 13.ix.1948, sta. 1049B, leg. PWH. Aruba.— 8 ♂♂, 2 ovig. ♀♀ (RMNH D 1716); 3 ♂♂, 2 ovig. ♀♀ (RMNH D 1873), 1883, A. J. van Koolwijk; 1 ♂ (ZMA), collectie de Man.— NW, N of Oranjestad, Palm Beach: 1 ♂, 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 14774), on pieces of coral, 1 m., 30.xii.1958, leg. P. A. van den Heuvel.— Oranjestad, Punta Braboe: 1 ovig. ♀ (ZMA), silty lagune, at 0.5 m., in seaweed, 18.vi.1930, leg. PWH.— Punta Braboe: 6 ♂♂, (5 juv.), 2 juv. ♀♀ (ZMA), 18.vi.1930, leg. PWH.— Reef Boekoeti: 1 ♂, 1 juv. ♀ (ZMA), 25.vi.1930, leg. PWH; 1 ♂ (ZMA).— Lagoen Boekoeti: 3 ♂♂, 4 juv. ♀♀ (2 juv., 2 ovig.) (ZMA), 18.vi.1930, leg. PWH; 2 ♂♂, 1 juv. ♀ (ZMA).— S of Palm Beach, Poos Chikitoe: 10 ♂♂ (5 juv.), 6 ♀♀ (5 juv., 1 ovig.), between corals, 0-1 m., 18.iii.1957, sta. 1180, leg. LBH.— 17 ♂♂ (8 juv.), 11 juv. ♀♀ (RMNH D 36987), from corals, 22.iii.1957, sta. 1191, leg. LBH.— Paardenbaai: 1 ♂ (RMNH D 2208), coral-rocks, dredge, 1 fathom (= 1.83 m), 3.viii.1905, J. Boeke.— Key opposite to Oosthaven: 13 ♂♂ (9 juv.), 9 ♀♀ (7 juv., 2 ovig.), sandy with some *Porites* and *Thalassia*, *Rhizophora*, 0-1 m., 28.iv.1955, sta. 1303, leg. PWH.— Bacuti reef, S of Oranjestad, Lagoon side, S point: 10 ♂♂ (2 juv.), 3 ovig. ♀♀ (RMNH D 7928), sandy debris with *Halimeda* and *Zoanthus*, some *Thalassia*, *Cassiopea*, 0.5-1 m., 17.i.1949, sta. 1007, leg. PWH.— Bacuti reef, sea side: 4 ♂♂ (2 juv.), 4 ♀♀ (3 juv., 1 ovig.) (RMNH D 7930), coral debris with *Porites* and *Thalassia*, 0-1 m., 17.i.1949, sta. 1006a, leg. PWH; 7 ♂♂ (1 juv.), 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 36934), reef debris with muddy sand, *Porites* flat, *Rhizophora*, 0-0.75 m., 6.v.1955, sta. 1006b, leg. PWH; 6 ♂♂ (5 juv.), 2 juv. ♀♀ (RMNH D 36977).— SW coast, NW of Savaneta: 2 ♂♂ (1 juv.) (RMNH D 36980), at night in algae, 21.iii.1957, sta. 1190, leg. LBH; 17 ♂♂ (4 juv.), 14 ♀♀ (10 juv., 2 ovig.) (RMNH D 36982), sand bottom, between corals and algae on outside of lagune, 19.iii.1957, sta. 1185, leg. LBH. Islote Aves.— 2 ♂♂, 1 ♀, 1 carapace (RMNH D 36943), 18-23.v.1956, leg. J. S. Zaneveld. Tobago.— 18 ♂♂ (12 juv.), 9 ♀♀ (6 juv., 3 ovig.) (ZMC), iv and 1.xii.1916, leg. Th. Mortensen.— 10 ♂♂ (3 juv.), 12 ♀♀ (11 juv., 1 ovig.) (RMNH D 36963), Buccoo Bay, near Reef, sandy bottom with some reef debris and corals, 0.5-1 m., 16.i.1955, sta. 1386, leg. PWH. Mixed sample.— Florida (U. S. A.), St. Thomas and West Indies: 4 ♂♂ (1 juv.), 3 ♀♀ (1 juv., 2 ovig.) (ZMC). Vera Cruz (Mexico) and St. John: 9 ♂♂ (5 juv.), 8 ♀♀ (3 juv., 3 ovig.) (ZMC), leg. Liebmann and Ørsted. Locality unknown.— 1 ♂, 1 ovig. ♀ (ZMC).

Description.— The carapace is broader than long, rather flat and the branchial sulci on its surface are broken up by transverse grooves. The rostrum is little advanced, incised by a narrow notch. Basal antennal segment very wide and with two spines, of which the second, situated on the antero-external angle, is twice as long and broad as the first. The antennae are 0.17 times the carapace length. The orbit is armed with one spine below (not counting the basal antennal spines) and two or three above. These two or three spines consist of one preorbital spine, one postorbital spine, and sometimes one spinule in between. The carapace has four anterolateral lobes increasing in size posteriorly.

The chelipeds of the male are much stouter and almost twice as long as the first pair of ambulatory legs; the merus is triangular in transverse section and has two



Figs. 44-47. *Mithraculus sculptus* (Lamarck, 1818): 44. dorsal view of the animal (after Velez, 1977), 10 mm indicated; 45. right basal antennal segment (RMNH D 36935), 1 mm indicated; 46. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 36935), 1 mm indicated; 47. carpus of the right cheliped (RMNH D 36935), 2 mm indicated.

large spines on the inner upper margin, three or four tubercles on the outer upper margin; the carpus is completely smooth, but in the juveniles sometimes little white spots can be observed giving the impression of being tubercles; the palm is smooth and compressed; the fingers have a long and wide gape, the cutting edges are denticulate and there is a large tooth at one third of the gape on the dactylus and one halfway the gape on the propodus; this last tooth is composed out of three smaller lobes that increase in size distally. In the female the fingers gape less and are without teeth. In the smaller and juvenile specimens hairs are present on the inner margin of both fingers. The first pair of ambulatory legs is 1.25 times the carapace length

(including the rostrum). The ambulatory legs are covered with a coat of stiff setae. Minute spines are present in the middle on the upper border of the merus, carpus and propodus. The meri of the first two pairs of ambulatory legs are armed with two to four tubercles.

The male gonopod is long, stout and slightly bent. It is dorsoventrally flattened, the inner distal margin incised. This incision is followed by a lobe; the tip of the gonopod tapers rather quickly to a narrow point placed near the outer margin. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.—The largest specimen at my disposal is an adult male of 23.3 mm long (including the rostrum) and 27.1 mm broad (including the lobes) (RMNH D 36935).

Colour.—My spirit specimens are generally olive-green in colour with bluish white lighter spots posteriorly on the carapace. Some specimens are even brownish green in colour. The tips of chelipeds as well as those of the ambulatory legs are white. The ventral surface of the animals is of the same colour as the dorsal surface.

Remarks.—The differences between *Mithraculus sculptus* and *Mithraculus coryphe* have already been discussed in the text of the latter species. In general appearance *Mithraculus sculptus* reminds one most of *Mithraculus forceps*. Especially the more brownish specimens closely resemble this species. The juveniles of the two species are almost identical. Here also the two best discriminating characters are the shape of the basal antennal segment and that of the anterolateral lobes. In *Mithraculus sculptus* the lobes are rounded in contrast to the spinous anterolateral 'lobes' in *Mithraculus forceps*. In adult specimens of *Mithraculus forceps* the branchial sulci are not broken up by transverse grooves and they have a more pinkish than brownish colour. The carpus of the cheliped of the latter species has always a tubercle on the inner upper margin, which is more spinous in juveniles or young specimens. The present species has previously been reported to be associated with corals, sponges and sea anemones. It was found associated with corals by Rathbun (1925) and Powers (1977), Chace (1956a) reported it abundant on the coral *Acropora* spec. Rathbun (1925) reported them in sponges, Colin (1978) from among the branches of *Porites furcata* Lamarck, and from the sea anemone *Stichodactyla helianthus* (Ellis), while Hazlett (1979) found the species at the column or among the tentacles of the sea anemones *Condylactis gigantea* (Weinland). In the material examined specimens were found associated with *Acropora cervicornis* (Dana), *Porites* spec., and *Fragmentopoma* spec.

Distribution.—The species has been reported in the literature from: Florida, U.S.A., (Gibbes, 1850; Stimpson, 1871; Kingsley, 1880; A. Milne Edwards, 1880; Kendall, 1891; Rathbun, 1892, 1898, 1901, 1925; A. Milne Edwards & Bouvier, 1923; Pearse, 1932; Hazlett, 1979), Mexico (Ives, 1891), Gulf of Mexico (Powers, 1977), Bahamas (Rathbun, 1892, 1898, 1901, 1925; Rankin, 1898, 1910; Schmidt, 1939, Garth, 1978), West Indies (White, 1847), Antilles (H. Milne Edwards, 1834; Guérin-Méneville, 1856, 1857; de Saussure, 1858, 1858a; Gundlach, 1887), Cuba (Guérin-Méneville, 1857; von Martens, 1872; Gundlach, 1887; Torralbas, 1900 (1917); Rathbun, 1925; Boone, 1930; Gomez & Ortiz, 1976), Jamaica (Benedict, 1892; Rathbun, 1892, Calventi, 1974), Belize (Rathbun, 1925), Puerto Rico (Rathbun, 1901, 1925; Glynn, 1964), St. Thomas (Rathbun, 1892, 1925), Antigua (Rathbun, 1921, 1925), Barbados (Rathbun, 1892, 1921, 1925; Jones, 1969), Panama (Stimpson, 1871; Nobili, 1897),

Colombia (A. Milne Edwards, 1880; A. Milne Edwards & Bouvier, 1923; Vélez, 1977), Honduras (Rathbun, 1925), Martinique (Gundlach, 1887; Doflein, 1899), St. Barts (Aurivillius, 1889), Guadeloupe (Desbonne & Schramm, 1867 (1914)) Curaçao (Rathbun, 1919, 1924, 1925), Aruba (Rathbun, 1919, 1925), Venezuela (von Martens, 1872; Gundlach, 1887; Chace, 1956; Rodriguez, 1980), Surinam (von Martens, 1872; Gundlach, 1887), and Brazil (Rathbun, 1901, 1925; Fausto, 1967, 1974).

Mithraculus forceps A. Milne Edwards, 1875
(figs. 48-51)

Mithraculus forceps A. Milne Edwards, 1875: 109; A. Milne Edwards, 1878: pl. 23 fig. 1.

Mithraculus hirsutipes Kingsley, 1879: 147; Kingsley, 1880: 389, pl. 14 fig. 1; Heilprin, 1889: 147.

Mithrax hirsutipes; Miers, 1886: 87; Rankin, 1900: 532.

Mithrax forceps; Miers, 1886: 87, 88; Rathbun, 1892: 269; Nutting, 1895: 123; Rankin, 1898: 235; Rathbun, 1898: 260; Rathbun, 1898a: 579; Rathbun, 1900a: 143; Moreira, 1901: 62; Rathbun, 1901: 70; Rankin, 1910: 78; Hay & Shore, 1918: 457, pl. 38 fig. 1; Rathbun, 1919: 345; Rathbun, 1924: 20; Pearse, 1932b: 121; Rathbun, 1933: 32; Lebour, 1944: 121, text-fig. 11; Wass, 1955: 168; Menzel, 1956: 45; Schöne, 1968: 644; Jones, 1969: 382; LaTourette, 1974: 100, 125; Pequegnat & Ray, 1974: 236, figs. 1-4; Ray, 1974: 267, figs. 250, 251; Rodriguez, 1980: 288, pl. 25; Gore, Scotto & Yang, 1982: 525; Abele & Kim, 1986: 528, 529, figs c-d.

Mithrax (*Mithraculus*) *hirsutipes*; Ortmann, 1893: 54.

Mithrax (*Mithrax*) *forceps*; Young, 1900: 96.

Mithrax forceps *hirsutipes*; Verrill, 1908: 409, fig. 42, pl. 23 figs. 4-6.

Mithrax (*Mithraculus*) *forceps*; Rathbun, 1921: 85; Rathbun, 1925: 431, pl. 156; Chace, 1940: 67; Chace, 1956: 161; Chace, 1956a: 21; Bullis & Thompson, 1965: 12; Williams, 1965: 258, figs. 238, 245E; Coêlho, 1969: 237; Türkay, 1968: 254; Coêlho, 1971: 141; Coêlho & Ramos, 1972: 216; Fausto, 1974: 17; Gomez & Ortiz, 1976: 16; Powers, 1977: 55; Vélez, 1977: 132, fig. 21; Wilson, Scotto & Gore, 1979: 307-327; Williams, 1984: 337, figs. 272, 275F.

Mithrax (*Mithraculus*) *coryphe*; Boone, 1930: 99, pl. 30 fig. A (not Herbst, 1801).

Mithraculus ochraceus Gomez, 1933: 4.

Material.—U.S.A., Florida.—1 ♂, 4 ♀♀ (3 juv.) (ZMC), 27°29'6"N 80°17'3"W, 5.2 m., 28.vi.1977, sta. LD 19A, leg. R. Gore; 4 juv. ♂♂, 2 juv. ♀♀ (ZMC), sta. LD 19C; 1 juv. ♂, 2 juv. ♀♀ (ZMC), quant. *Oculina*, 6.7 m., 12.xi.1977, sta. 25A, leg. J. Reed & L. Edmiston.—Off Pepper State Parc: 2 ♂♂ (1 juv.) (ZMC), 27°30'N 18°17'W, *Oculina* from third reef, quant. A, 6.1 m., 9.ix.1976, sta. LD 14, leg. J. Reed.—Indian River region, near Fort Pierce: 57+ *Zoea* I, 10 *Zoea* II, 2 Megalopa, 1 first crab stage (RMNH D 31964), 1977, don. L. E. Scotto.—Elliot Key, E side, 3 km offshore: 1 ♂, 1 juv. ♀ (RMNH D 37028), small coral reef on sandbottom with *Thalassia* and *Syringodium*, 2-6 m., 5.ix.1963, sta. 1414, leg. PWH.—Miami, N point Virginia Key, Norris Cut: 2 ♂♂, 1 ovig. ♀ (RMNH D 27736), 0-0.5 m., 12.i.1971, leg. LBH.—Key Biscayne, NE tip of Key: 1 juv. ♀ (RMNH D 37036), sandy beach with mangrove rock, tide pool with *Zoanthus* and *Tetraclita*, *Thalassia* and *Halodule*, 0-1 m., 7.ix.1963, sta. 1411, leg. PWH; 1 ♂ (RMNH D 37046).—Key Biscayne, Bear Cut: 5 ♂♂ (2 juv.), 9 ♀♀ (7 juv., 2 ovig.) (RMNH D 37006), leg. LBH; 1 juv. ♀ (RMNH D 37151), 12.viii.(1966?), leg. LBH; 3 ♂♂ (2 juv.), 3 ♀♀ (1 juv., 2 ovig.) (RMNH D 37003), 7.ii.1965, leg. LBH; 8 ♂♂, 15 ♀♀ (5 juv., 9 ovig.) (RMNH D 36993), 9-20.xii.1964, leg. LBH; 1 ♂ (RMNH D 36998), under rocks, 0-1 m., 7.vi.1967, leg. LBH; 1 ovig. ♀ (RMNH D 36999), 0-1 m., 6.viii.1966, leg. LBH; 1 ♂, 4 ♀♀ (3 juv.) (RMNH D 37000), 5.vii.1968, leg. LBH; 2 ♂♂, 1 ovig. ♀ (RMNH D 37057), 6.iii.1974, leg. R. Work & LBH; 1 juv. ♂, 1 ovig. ♀ (RMNH D 37002), seagrass, serpulids, 0-1 m., 3.viii.1966, leg. LBH; 1 juv. ♂, 1 juv. ♀ (RMNH D 37005), seagrass, sponges, 0-1 m., 27.vii.1966, leg. LBH; 1 ♂ (RMNH D 37052), 0-1 m., 6.iii.1974, leg. LBH; 6 ♀♀ (1 juv., 4 ovig.) (RMNH D 37001), shore, between seagrass and algae, 0-1 m., 1-9.ix.1963, leg. LBH.—Virginia Key, Bear Cut near Marine Laboratory: 1 juv. ♂ (RMNH D 37004), between seagrass and algae, 0-0.5 m., 2-9.ix.1963, leg. LBH.—Bermuda.—1 ♂, 2 juv. ♀♀ (RMNH D 7418), viii-ix.1925, H. Boschma. Gulf of Mexico.—Mexican Bight: 3 ♂♂, 7 ♀♀ (2 juv., 5 ovig.) (ZMC), leg. Liebmann. Mexico.—Vera Cruz, Isla Verda: 4 ♂♂, 3

ovig. ♀ (RMNH D 21748), 30.vii.1965, J. A. Cabrera. *West Indies*.— 9 ♂♂, 1 ovig. ♀ (RMNH D 37030), leg. PWH; 6 ♂♂ (1 juv.) (ZMC), leg. Bang. *Cuba*.— 1 juv. ♂ (MP B-20873), 1914, leg. E. de Boury. *Jamaica*.— Port Royal Cays, Farewell Buoy: 1 ♀ (RMNH D 34855), host of *Heterosaccus occidentalis* (Boschma), 10 m., 14.i.1962, R. G. Hartnoll, colln. Boschma no. 1494. *St. Thomas*.— 4 ♂♂, 2 ovig. ♀♀ (ZMC), leg. Riise. *St. John*.— Coral Bay: 2 juv. ♂♂, 2 juv. ♀♀ (ZMC), leg. Chr. Levinse. *St. Maarten*.— Oyster Pond, SE part, near mouth: 1 juv. ♀ (RMNH D 37040), sandy part of lagoon with some *Rhizophora* and patches of *Thalassia*, *Syringodium* and *Halimeda*, 0-1.5 m., 13.x.1963, sta. 1429, leg. PWH. *Panama*.— Colon (Limon Bay): 1 ♀ (RMNH D 36991), 9°21'N 79°57'W, Night Light Dip Net, 4.vii.1966, Pillsbury sta. 319. *Colombia*.— Gulf of Cariaco: 24 ♂♂ (17 juv.), 15 ♀♀ (13 juv., 2 ovig.) (ZMA), 31.i.1896, Yacht "Chazalie".— Dept. Bolívar, S of Cartagena, Islas del Rosario: 1 ovig. ♀ (SMF), coralslabs, 25 m., -ii.1986, leg. Luz-Elena Velasquez T.— 1 ovig. ♀ (SMF 7060), xi.1969, leg. Henning & Klaassen.— Isla Grande, Punta Arenas, near Barbaroes: 2 juv. ♂♂, 2 juv. ♀♀ (SMF 7353), 1 juv. ♂, 2 juv. ♀♀ (SMF), low tide, under stones, 21.x.1978, leg. D. Rodriguez.— Vicinity of Santa Marta: 1 ♂ (SMF 9945), 1 ovig. ♀ (SMF 7362), leg. M. Vélez.— Airport Santa Marta: 1 ♂ (SMF), in algae, 0.5 m., 3.xii.1978.— Santa Marta: 1 juv. ♂, 1 juv. ♀ (SMF 9086), 26.i.1976, leg. M. Vélez.— Institute at Santa Marta: 1 juv. ♂ (SMF), corals and sea-stars, 1969/70.— Burucuco, N of Santa Marta: 9 ♂♂ (3 juv.), 5 ♀♀ (3 juv.) (SMF 9944), 1 juv. ♂, 1 juv. ♀ (SMF), 25.x.1978, leg. H. & M. Türkay.— Punta de Betin, near Santa Marta: 1 juv. ♀ (SMF), 6 m., 9.viii.1985, leg. HGM; 1 juv. ♀ (SMF), 13 m., leg. HGM; 1 juv. ♀ (SMF), 14 m., leg. HGM.— Punta de la Aguja, 4 km E of Santa Marta coralslabs: 1 juv. ♂ (SMF), 2.x.1985, leg. HGM.— Santa Marta, Taganga: 2 juv. ♂♂, 1 juv. ♀ (ZMA), littoral, 8.ii.1896, Yacht "Chazalie"; 1 juv. ♂, 4 ♀♀ (3 juv.) (ZMA), at 15-0 m., ii.1896, Yacht "Chazalie".— Tayrona Parc, Bahia Concha: 1 juv. ♂ (SMF), from dead *Colpophyllia natans*, 1 m., 13.viii.1985, leg. HGM; 2 juv. ♂♂, 1 juv. ♀ (SMF), *Sargassum*, 27.vi.1985, leg. HGM.— 2 ♂♂ (1 juv.), 1 ♀ (SMF), *Thalassia*, 1 m., leg. HGM; 1 ovig. ♀ (SMF), 1.5-2 m., 3.iii.1986, leg. HGM; 1 juv. ♂ (SMF), 1-2 m., 2.iv.1986, leg. HGM; 1 juv. ♂ (SMF), 2-3 m., 2.v.1986, leg. HGM; 1 juv. ♂, 2 ovig. ♀♀ (SMF), 7.xii.1985, leg. HGM; 1 ♂, 1 ovig. ♀ (SMF), 8.xi.1985, leg. HGM; 2 ♂♂, 4 ♀♀ (1 juv.) (SMF), 2-4 m., 2.x.1986, leg. HGM; 2 juv. ♂♂ (SMF), from algae, 5-7 m., 22.v.1985, leg. HGM.— Bahia de Chengue: 1 juv. ♂, 1 juv. ♀ (SMF), from mangrove-roots, 13.ix.1985, leg. HGM; 3 ♀♀ (1 ovig.) (SMF), coralslabs, 7-8 m., 4.ix.1985, leg. HGM; 1 ovig. ♀ (SMF), 21.i.1985, leg. HGM; 1 juv. ♂ (SMF), *Thalassia*, 0.5-1 m., 8.ix.1985, leg. HGM; 1 juv. ♂ (SMF), 1 m., 4.ix.1985, leg. HGM; 2 juv. ♀♀ (SMF), 1.xi.1985, leg. HGM; 3 juv. ♂♂, 7 ♀♀ (5 juv., 2 ovig.) (SMF), 1-2 m., 9.iii.1985, leg. HGM; 3 ♀♀ (1 juv., 1 ovig.) (SMF), bottom covered with Corallinacea, 21.i.1986, leg. HGM; 2 juv. ♀♀, from Corallinacea in *Thalassia*, 2 m., 4.ix.1985, leg. HGM.— Bahia de Nenguangue: 1 juv. ♂ (SMF), *Thalassia*, 0.5-2 m., 30.vii.1985, leg. HGM; 3 juv. ♂♂, 1 juv. ♀ (SMF), 0-1 m., 5.viii.1985, leg. HGM; 1 juv. ♂ (SMF), from Hydrozoa and corals, 8.x.1978, leg. H. & M. Türkay.— Bahia de Cinto: 9 juv. ♂♂, 3 juv. ♀♀ (SMF), from algae, 4.vi.1985, leg. HGM.— Arrecifes Punta el Diamante: 1 ♀ (SMF), leg. HGM.— Punta Canaverales: 2 ♂♂, 3 ♀♀ (1 juv., 1 ovig.) (SMF), 1-1.5 m., 25.ii.1986, leg. HGM. *Aruba*.— 1 ovig. ♀ (RMNH D 1372), 1883, A. J. van Koolwijk.— Punta Braboe: 2 juv. ♂♂, 1 juv. ♀ (ZMA), 18.vi.1930, leg. PWH.— Oranjestad, Lagoen Boekoeti: 12 ♂♂ (6 juv.), 6 ♀♀ (2 juv., 3 ovig.) (ZMA), 18.vi.1930, leg. PWH.— Lagoon: 1 ovig. ♀ (RMNH D 2225), shallow water between the algae, small dredge, 8.viii.1905, J. Boeke.— Rincón: 1 ♂ (RMNH D 37042), rocky beach with sand behind reef, 0-1 m., 7.v.1955, sta. 1310, leg. PWH. *Curaçao*.— 1 ♀ (ZMA), from *Sphaeospongia versparia*, leg. E. Westing & P. Hoetjes.— Knip Baai, N side: 1 juv. ♂ (RMNH D 37024), steep limestone cliff, 0-1.5 m., 6.ii.1949, sta. 1018, leg. PWH.— Piscadera Baai, mouth, near Carmabi: 1 juv. ♂ (RMNH D 37010), 5.i.1957, sta. 1040, leg. LBH.— Piscadera Baai, Boca Piscadera (outer bay): 2♂ (1 juv.), 3 ♀♀ (1 juv., 1 ovig.) (RMNH D 37037), rocky shore with sand at Piscadera Bay Club, 0-1.5 m., 29.i.1949, sta. 1029, leg. PWH; 3 ♂♂, 2 ovig. ♀♀ (RMNH D 7893), on fence and poles of swimming pool, 0-1 m., 29.i.1949, sta. 1029A, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NE part: 1 juv. ♂, 2 ♀♀ (1 juv., 1 ovig.) (RMNH D 37044), sand with a few limestone boulders, 3.5 m., 3.i.1964, sta. 1453, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NW part: 4 ♂♂ (3 juv.), 3 ♀♀ (1 juv., 2 ovig.) (RMNH D 37041), muddy sand with rock debris, 1-1.5 m., 5.i.1964, sta. 1458, leg. PWH.— Piscadera Baai, entrance, NW: 1 juv. ♀ (RMNH D 37012), at column of sea anemone, between and in rocks, 23.i.1957, sta. 1060, leg. LBH. Piscadera Baai, entrance: 10 juv. ♂♂, 2 juv. ♀♀ (RMNH D 37016), *Rhizophora*, 0.25 m., 21.i.1957, sta. 1055, leg. LBH.— Piscadera Baai, entrance, near Willemstad: 73 ♂♂ (42 juv.), 46 ♀♀ (22 juv., 21 ovig.) (RMNH D 37018), sandybottom or muddy sand, with rocks, on sponges, between algae, sponges, hydroids, tunicates etc., 0-1.5 m., 12.xi-xii.1956, sta. 1002, leg. LBH.— Piscadera Baai, Boca Stroink (entrance), W: 1 juv. ♂, 1 juv. ♀ (RMNH D 37038), 2 juv. ♂♂, 2 juv. ♀♀ (RMNH D 37048) sand with leaf decay and *Halimeda*, some *Thalassia*, 0.5 m., 14.xii.1963, sta. 1460A, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), water-pipe: 1 juv. ♂, 1 ovig. ♀ (RMNH D 37022), iron supports in tidal flow, with

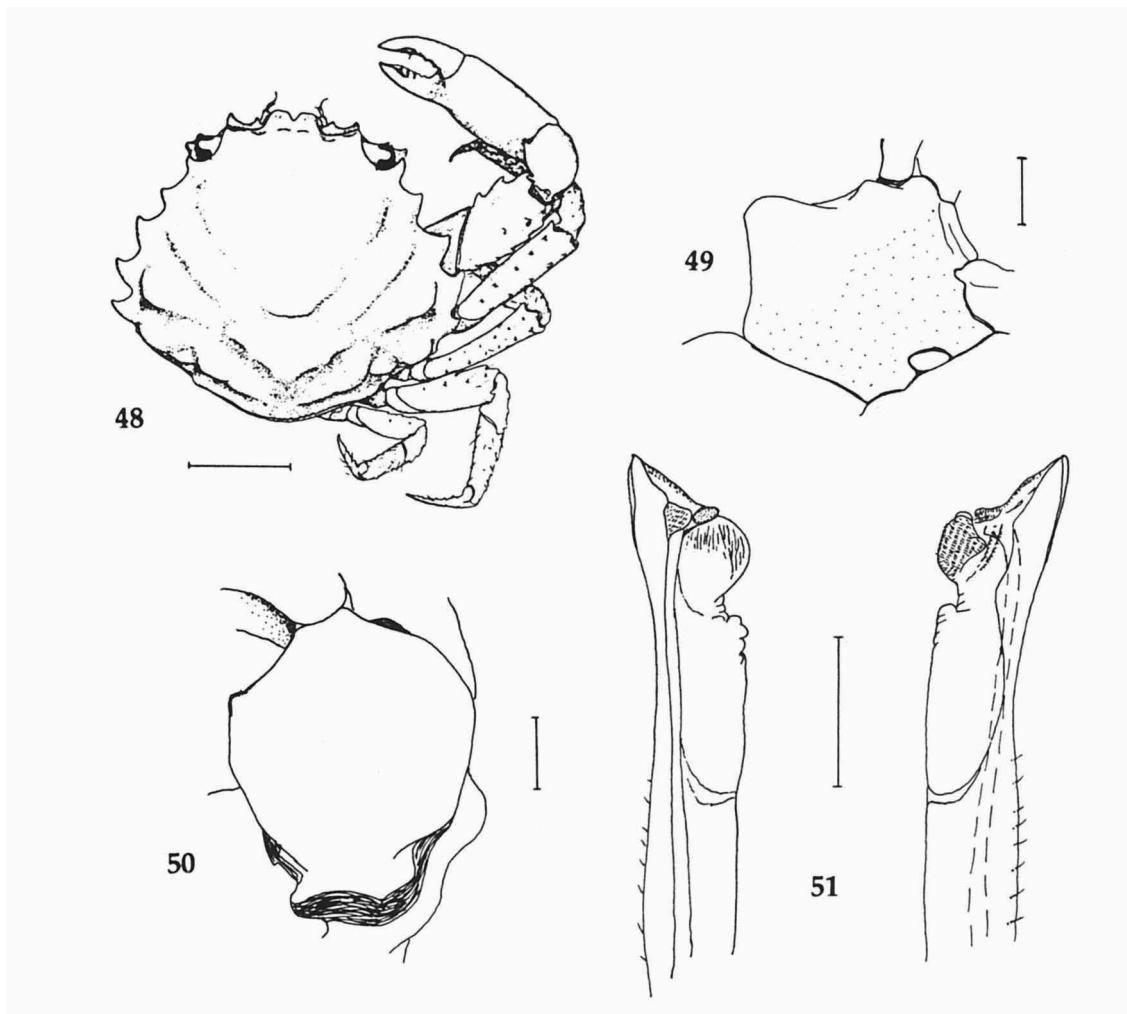
dense *Pennaria*, *Didemnum*, *Styela* and *Microcosmus*, 0-1 m., 2.i.1964, sta. 1462, leg. PWH.— Piscadera Baai, Boca Stroinck (entrance), W side, N of water-pipe: 1 juv. ♂ (RMNH D 37043), sandy bottom with *Halimeda*, scanty *Thalassia*, 1 m., 14.xii.1963, sta. 1463A, leg. PWH.— Spaanse Water: 4 ♂♂ (2 juv.), 4 ♀♀ (2 juv., 2 ovig.) (ZMA), 3.iv.1920, leg. C.J. van der Horst; 4 juv. ♂♂ (ZMA), from *Porites porites*, 5.iv.1920, leg. C.J. van der Horst; 1 ♂ (ZMA), from mangrove-roots, 8.iv.1920, leg. C.J. van der Horst; 3 ovig. ♀♀ (ZMA), from *Siderastrea*, 29.iv.1920, leg. C.J. van der Horst.— Spaanse Water, inner bay: 2 juv. ♂♂ (RMNH D 37014), sea grass and *Rhizophora*, at night with net, 14.ii.1957, sta. 1104, leg. LBH.— Spaanse Water, near Jetty: 10 ♂♂ (2 juv.), 12 ♀♀ (5 juv., 5 ovig.) (RMNH D 36994), bottom with much seagrass, -xi.1954, leg. J. S. Zaneveld.— Spaanse Water, along Jetty: 1 juv. ♀ (RMNH D 36995), 29.xii.1954, leg. J. S. Zaneveld; 4 ♂♂, 3 ♀♀ (2 juv., 1 ovig.) (RMNH D 36997), near *Rhizophora*, 19.xii.1954, leg. J. S. Zaneveld.— Spaanse Water, mouth, Santa Barbara Beach, near Nieuwpoort: 1 juv. ♂ (RMNH D 37013), between *Zostera*, at night, 8 and 13.ii.1957, sta. 1092, leg. LBH. Spaanse Water, mouth, near Nieuwpoort: 3 ♂♂ (2 juv.), 2 ♀♀ (1 juv.) (RMNH D 37015), between algae, 25.xi.1956, sta. 1013, leg. LBH.— Spaanse Water, Brakke Put, near Jongensstad: 9 (7 juv.), 20 (14 juv., 6 ovig.) (RMNH D 37009), sandy bottom with mud and rocks, on and in stones, between algae etc., 0-1 m., 31.xii.1956, sta. 1030, leg. LBH; 12 ♂♂ (11 juv.), 9 ♀♀ (7 juv., 1 ovig.) (RMNH D 37017, on *Sargassum*, 0-0.5 m., 31.xii.1956, sta. 1031, leg. LBH).— Spaanse Water, inner bay, Brakke Put: 1 juv. ♀ (RMNH D 37150), rock debris, *Thalassia*, mussels, 19.i.1955, sta. 1340, leg. J. S. Zaneveld, don. PWH. Spaanse Water, inner bay, Jan Sofat islet: 1 juv. ♂, 4 ♀♀ (3 juv.) (RMNH D 37021), rocky with *Rhizophora* in mud, 0-1 m., 17.xi.1968, sta. 1629, leg. PWH.— Fuik Baai, entrance, NW: 1 ♂ (RMNH D 37011), under rocks, 0-1 m., 13.i.1957, sta. 1051, leg. LBH.— Fuik Baai, NW end: 2 juv. ♂♂, 5 ♀♀ (4 juv., 1 ovig.) (RMNH D 37008), lagune with clear sand, rocks, algae, somewhat muddy at shore, 0-0.5 m., 13.i.1957, sta. 1052, leg. LBH.— St. Jorisbaai, S shore, near Choloma: 1 juv. ♂, 5 ♀♀ (2 juv.) (RMNH D 37007), 3.i.1957, sta. 1038, leg. LBH. St. Jorisbaai, inner bay, S shore, SE part: 1 juv. ♀ (RMNH D 37026), sandy rock debris with *Thalassia*, 0-1 m., 23.x.1968, sta. 1642, leg. PWH.— St. Jorisbaai, inner bay, NW inlet: 1 juv. ♀ (RMNH D 37019), muddy sand with rock debris, old tires, *Thalassia* and *Halodule*, 0.25-1 m., 25.ii.1970, sta. 1668A, leg. PWH.— Caracas Baai: 1 juv. ♂ (ZMA) 19.iv or 13.v.1920, leg. C.J. van der Horst; 1 ♂ (ZMA), 8.iv and 1.v.1920, leg. C.J. van der Horst; 1 juv. ♂ (ZMA), under stones along shore, 3.v.1920, leg. C.J. van der Horst; 9 ♂♂ (6 juv.), 4 ♀♀ (3 juv., 1 ovig.) (ZMA), from sponge, 10.v.1920, leg. C.J. van der Horst; 1 ♂ (RMNH D 36996), in kanasters, 17.xi.1954, leg. J. S. Zaneveld.— Fuik Baai: 1 ♂ (RMNH D 2271), shallow water, corals, dredge, 18.vii.1905, leg. J. Boeke.— Vaensen Baai: 1 ♂ (RMNH D 30364), at the column of *Stichodactyla helianthus*, 1.5-3 m., 24.vii.1973, leg. J. C. den Hartog & K. de Windt.— Santa Cruz Baai: 2 juv. ♂♂, 3 juv. ♀♀ (ZMA), 5.vi.1930, leg. PWH. Bonaire.— Paloe Lechi (Playa Lechi), overflow of Salinja: 5 juv. ♂♂, 9 ♀♀ (5 juv., 3 ovig.) (RMNH D 7895), sandy reef, 1-2.5 m, 4.ix.1948, sta. 1056C, leg. PWH.— Kralendijk: 1 juv. ♂, 2 juv. ♀♀ (ZMA), 11.xi.1930, leg. PWH; 1 ♂ (ZMA), 19.v.1920, leg. C.J. van der Horst; 2 ♂♂ (1 juv.), 1 juv. ♀ (ZMA), from coral, 23 and 28.iv and 5.v.1920, leg. C.J. van der Horst; 1 juv. ♂, 1 juv. ♀ (ZMA), 11.v.1930, leg. PWH.— Lagoen: 1 juv. ♂ (ZMA), 2.xi.1930, leg. PWH.— Lac, entrance: 3 juv. ♂♂, 1 juv. ♀ (ZMA), 5.x.1930, leg. PWH; 15 ♂♂ (6 juv.), 5 ovig. ♀♀ (ZMA), sandy part behind reef at entrance, 5.x.1930, leg. PWH; 1 juv. ♀ (RMNH D 7894), sandy reef with much *Acropora*, 1-2 m., 1.x.1948, sta. 1068A, leg. PWH. Lac, 200 m. W of Cai: 1 ♂, 10 ovig. ♀♀ (RMNH D 37034), sand with some *Thalassia* and *Syringodium*, 6 m., 11.viii.1967, sta. 1561, leg. PWH.— Lac, entrance, Boca behind reef, Bao di Dam, 500 m. SW of Cai: 8 juv. ♂♂, 4 juv. ♀♀ (RMNH D 37039), among *Acropora cervicornis*, 1 m., 25.viii.1967, sta. 1562, leg. PWH.— Lac, entrance, Secu di Sorobon, 100 m. N of Sorobon Point: 2 ovig. ♀♀ (RMNH D 37047), sandy *Lithothamnium*, ridge, some *Thalassia*, *Tripteneutes*, 0.25-1 m., 21.viii.1967, sta. 1565, leg. PWH.— Lac, entrance, Secu di Sorobon, 250 m. N of Sorobon Point: 1 ♂ (RMNH D 37023), 1 ♂, 2 ovig. ♀♀ (RMNH D 37045), *Porites* flat with *Thalassia* and *Lithothamnium*, 0.1-0.5 m., 21.viii.1967, sta. 1566, leg. PWH.— Lac, central part of basin, Binnenklip, 1 km WSW of Cai: 1 ♂, 2 ♀♀ (1 ovig.) (RMNH D 37027), sand with some *Thalassia* and *Porites*, 3 m., 24.viii.1967, sta. 1567, leg. PWH.— Lac, central part of basin, Binnenklip, 1 km WSW of Cai: 4 juv. ♂♂, 6 ♀♀ (2 juv., 4 ovig.) (RMNH D 37033), the layer of sand on limestone, *Porites* and *Siderastrea*, 2 m., 24.viii.1967, sta. 1568, leg. PWH; 3 ♂♂, 2 ovig. ♀♀ (RMNH D 37031), sand on limestone, 2.5 m., 10.iii.1970, sta. 1568A, leg. PWH. Lac, S part of Basin, Sorobon (Soerobon): 4 ♂♂ (3 juv.), 2 juv. ♀♀ (RMNH D 37049), *Rhizophora*, scanty *Thalassia* on sandy mud, 0-1.5 m., 17.iv.1955, sta. 1062a, leg. PWH.— Boca Washikemba: 1 juv. ♂ (RMNH D 37149), beachrock with pools, limestone, 0-1 m., 7.iv.1955, sta. 1375, leg. PWH. Klein Bonaire.— E shore: 1 juv. ♂ (ZMA), 10.ix.1930, leg. PWH.— Eastern coast: 1 juv. ♂, 1 ♀ (ZMA), leg. PWH.— E coast at Landing: 3 ♂♂ (2 juv.), 1 juv. ♀ (RMNH D 7892), reef debris on sandy beach, 0-1.5 m., 13.ix.1948, sta. 1049B, leg. PWH. Venezuela.— 9 ♂♂ (7 juv.), 5 ♀♀ (3 juv., 1 ovig.) (ZMA), at 11 m.,

20.i.1896, Yacht "Chazalie".—Testigos, Isleta Iguana: 1 juv. ♂ (ZMA 103.674), 11°21'48"N 63°07'53"W, 24.ii.1982, West Ind. Eil. Exp. st. 82-26, leg. J. H. Stock.—Margarita Island: 4 ♂♂, 4 ♀♀ (1 ovig.) (SMF 4165), 1967, leg. Vogelsang.—Margarita, Punta Mangle: 1 juv. ♂ (RMNH D 37020), very muddy lagoon with *Rhizophora* and *Avicennia*, 0-1 m., 11.i.1964, sta. 1446, leg. PWH.—Margarita, Punta de Piedras, Estación Invest. Marinas: 15 ♂♂ (9 juv.), 6 juv. ♀♀ (RMNH D 37029), on poles of old jetty in muddy sand, *Thalassia* beds, 0-1 m., 12.i.1964, sta. 1447, leg. PWH.—Margarita, Punta de Piedras, N of the Estación Invest. Marinas: 4 ♂♂ (2 juv.), 2 juv. ♀♀ (RMNH D 37025), *Rhizophora* and dead branches with balanids, sponges and ascidians in narrow entrance of lagoon, 0-1.5 m., 12.i.1964, sta. 1448, leg. PWH.—Margarita, Puerto de la Restinga, E side: 4 ♂♂, 6 ♀♀ (4 juv., 1 ovig.) (RMNH D 37032), concrete and rock debris in entrance of large lagoon, muddy, *Rhizophora* with ascidians and sponges, 0-1 m., 11.i.1964, sta. 1449, leg. PWH.—Punta la Cruz: 1 ♀ (SMF 2093), 31.iii.1951, leg. A. Zilch. **Trinidad**.—1 ♀ (MP B-19463), 26.ix.1965, leg. H. O. von Hagen.—Pt. Gourd, near police station: 5 ♂♂ (2 juv.), 3 % (1 juv., 2 ovig.) (RMNH D 23710), among *Acropora*, near the shore, 26.ix.1965, H. O. von Hagen. **Tobago**.—Bucco Bay, near Hamlet: 1 ♂ (RMNH D 37035), sandy bottom with scattered *Acropora* and the other corals, *Halimeda*, 2-2.5 m., 16.i.1955, sta. 1385, leg. PWH.—3 juv. ♂♂, 1 ♀ (ZMC), iv and 1.xii.1916, leg. Th. Mortensen. **French Guyana**.—Cayenne: 1 ♂ (MP B-4567), leg. Virgile. **Brazil**.—Bahia: 1 juv. ♂ (ZMC), 25.viii.1863, leg. Andréa. **Mixed sample**.—Vera Cruz (Mexico) & St. John: 2 ♂♂ (ZMC), leg. Liebmann & Ørsted. **Locality unknown**.—1 ovig. ♀ (ZMC).

Description.—The carapace is broader than long, rather flat. The branchial sulci on its surface are not or very weakly broken by transverse grooves. The rostrum is little advanced, incised by a narrow notch. The basal antennal segment has two spines, of which the second, situated on the anteroexternal angle, is five times as large as the first. In small individuals two acute tips can be observed distally on the second spine. The antennae are 0.2 times as long as the carapace. The orbit is armed with one spine below (not counting the basal antennal spines), one at the outer angle and three (sometimes four) above. These three (or four) spines consist of one preorbital spine, one postorbital spine, and one (sometimes two) spine(s) in between. Sometimes the postorbital spine carries also a supraorbital spine. The carapace has four anterolateral spines, increasing in size posteriorly. Rarely a posterolateral spine can be observed, but if there is one it is always very small.

The chelipeds of the male are much stouter and 1.3 times as long as the first pair of ambulatory legs; the merus is triangular in transverse section, with five spines or tubercles on the outer or posterior upper margin, decreasing in size distally, and two prominent spines on the inner or anterior upper margin; the carpus is smooth, except for the presence of an acute spine (in older specimens rather blunt) on the inner upper margin; the palm is smooth and compressed; the fingers have a long and wide gape; the cutting edges are denticulate and there is a large tooth on both fingers, one on the dactylus at one third of the gape and one on the propodus at two thirds of the gape. On the inner margin of the spooned tips of the fingers there are two bundles of hairs. In the female the fingers gape less and are without teeth. The first pair of ambulatory legs is 1.3 times as long as the carapace (including the rostrum). The ambulatory legs are with long slender hairs. On the upper margin of the merus there are two rows of seven spines; the carpus and propodus each have two rows of three spines.

The male gonopod is long, stout and straight. It is dorsoventrally flattened, and a row of hairs is present on the outer lateral margin of the proximal half. In the distal half there is an incision which is followed by a large rounded lobe. The distal part of this lobe tapers sharply, but gradually, to a conical tip at the outer margin. The genital opening of the female is on the inner anterior part of the genital prominence.



Figs. 48-51. *Mithraculus forceps* A. Milne Edwards, 1875: 48. dorsal view of the animal (after Williams, 1965), 5 mm indicated; 49. right basal antennal segment (RMNH D 36993), 1 mm indicated; 50. carpus of the right cheliped (RMNH D 36993), 2 mm indicated; 51. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 36993), 1 mm indicated.

Measurements.—The largest specimen at my disposal is a male of 30.9 mm long (including the rostrum) and 31.9 mm wide (including the spines) (MP B-4567).

Colour.—Chestnut or terra-cotta or uniform yellowish brown, varying to dull yellow and to greenish brown. Often there is a white to pale yellow median dorsal stripe, especially in the young specimens. (Verrill, 1908).

My spirit specimens fit all very well in this colour description, but no specimens were observed with banded legs or a yellow median stripe.

Remarks.—This species is rather variable in its colour. It is perhaps this fact that misled Gomez in 1933 when he described his *Mithraculus ochraceus* as new. Gomez's figure of the animal leaves no doubt he dealt with *Mithraculus forceps*, as all typical

characters figured and described for *Mithraculus ochraceus* are the same for *Mithraculus forceps*.

This species is previously found to be associated with certain species of corals (Rathbun, 1924, 1925) and sponges (Powers, 1977). It has been reported from the corals *Acropora* spec. (Chace, 1956), *Porites furcata* Lamarck, and *Siderastrea* spec. (Rathbun, 1924), with the sponges *Ircinia strobilina* (Lamarck) and *Spongia officinalis* L. (Pearse, 1932b). The field notes of the material examined reported this species as associated with the corals *Acropora cervicornis* (Dana), and *Porites* spec., and from the column of the sea anemone *Stichodactyla helianthus* (Ellis).

Distribution.— This species has previously been reported from the following localities: North-Carolina, U.S.A., (Rathbun, 1892, 1901, 1925; Hay & Shore, 1918), South-Carolina, U.S.A., (Rathbun, 1892, 1925), Florida, U.S.A. (Kingsley, 1880; Miers, 1886; Rathbun, 1892, 1898, 1925; Pearse, 1932b; Wass, 1955; Menzel, 1956; Bullis & Thompson, 1965; Pequegnat & Ray, 1974; LaTourette, 1974; Wilson, Scotto & Gore, 1979), Texas, U.S.A., (Ray, 1974; Pequegnat & Ray, 1974), Mexico (Ray, 1974), Gulf of Mexico (Chace, 1956a; Powers, 1977), Bahamas (Rathbun, 1892, 1925; Nutting, 1895; Rankin, 1898, 1910), Cuba (Gomez, 1933; Chace, 1940; Gomez & Ortiz, 1976), Jamaica (Boone, 1930), Puerto Rico (Rathbun, 1901, 1925), St. Thomas (Rathbun, 1892, 1925; Rankin, 1898, 1910), Barbados (Rathbun, 1921, 1925; Jones, 1969), Colombia (Vélez, 1977), Aruba (Rathbun, 1919, 1925), Curaçao (Rathbun, 1892, 1919, 1924, 1925; Rankin, 1898, 1910), Venezuela (Rathbun, 1925; Chace, 1956; Türkay, 1968), Trinidad (Rathbun, 1925), Bermuda (Miers, 1886; Heilprin, 1889; Rathbun, 1892, 1901, 1925; Ortmann, 1893; Rankin, 1900; Verrill, 1908; Lebour, 1944), and Brazil (Rathbun, 1892, 1898a, 1900a, 1901, 1925; Moreira, 1901; Verrill, 1908; Coêlho, 1969, 1971; Coêlho & Ramos, 1972; Fausto, 1974; Ray, 1974).

Mithraculus ruber Stimpson, 1871
(figs. 52-55)

Mithraculus ruber Stimpson, 1871: 118; A. Milne Edwards, 1875: 111.
Mithraculus nudus A. Milne Edwards, 1875: 110; A. Milne Edwards, 1878: pl. 23 fig. 2.
Mithrax nudus; Miers, 1886: 87.
Mithrax rubei (sic); Miers, 1886: 87.
Mithrax (Mithrax) nudus; Young, 1900: 97.
Mithrax (Mithrax) ruber; Young, 1900: 98.
Mithrax ruber; Rathbun, 1901: 69; Rathbun, 1924: 21; Rathbun, 1933: 32; Schmidt, 1939: 29; Jones, 1969: 382; Rodriguez, 1980: 289, pl. 26.
Mithrax (Mithraculus) ruber; Rathbun, 1921: 85; Rathbun, 1925: 432, pl. 157; Coventry, 1944: 543; Chace, 1956: 161; Bonelly de Calventi, 1974: 26; Powers, 1977: 55; Vélez, 1977: 132, fig. 22; Abele & Kim, 1986: 528, 529 fig. e.
Mithrax humphreyi Jones, 1969: 381.

Material.— **Cuba.**— 1 ♂ (MP B-19457), 1914, leg. E. de Boury. **St. John.**— 1 specimen (ZMC), leg. Riise. **St. Maarten.**— Great Bay coast, near Philipsburg: 1 juv. ♂ (RMNH D 36923), between stones and algae, on stones on beach, 16-17.ii.1957, sta. 1111, leg. LBH. **St. Eustatius.**— Lynch Bay: 2 juv. ♂♂, 6 juv. ♀♀ (RMNH D 36924), between algae and under rocks, 1.iii.1957, sta. 1135, leg. LBH. **Guadeloupe.**— 1 ♂ (MP B-454, holotype of *Mithraculus nudus* A. Milne Edwards), leg. A. Milne Edwards; 1 ♂ (MP B-4568), leg. A. Milne Edwards. **Colombia.**— Dept. Magdalena, Isla del Morro: 1 juv. ♂ (SMF), coralslabs, 18 m., 9.x.1985, leg. HGM.— Moro de Guira, opposite Guira: 1 ♂ (SMF 9943),

on *Polythera*, 14.x.1978, leg. H. & M. Türkay.— Vicinity of Santa Marta: 1 juv. ♂ (SMF 7584), leg. Margarita.— Santa Marta: 1 ♂, 1 ovig. ♀ (SMF 9083), 28.i.1976, leg. M. Vélez.— Institute Santa Marta: 1 juv. ♂ (SMF), corals and sea-stars, 1969/70.— Punta de Betin: 1 juv. ♂ (SMF), coralslabs, 15 m., 1.vii.1986, leg. HGM; 1 ♂, 1 ovig. ♀ (SMF), 16 m., 2.i.1986, leg. HGM; 1 juv. ♂ (SMF), on harbourmole, 0.5-6 m., 3.ix.1985, leg. HGM; 1 juv. ♂ (SMF), from hydroids and sponges, 0-1 m., 14.iii.1986, leg. HGM; 2 ♂♂ (SMF), between stones, 1-2 m., 4.ii.1986, leg. HGM; 1 juv. ♀ (SMF), under stones, 0-0.5 m., 31.xi.1985, leg. HGM; 1 ♂ (SMF), 0-1 m., 28.i.1986, leg. HGM; 1 juv. ♂ (SMF), sandbottom and coral-slabs, 5-6 m., 14.iii.1986, leg. HGM.— Punta de Granate: 5 ♂♂ (4 juv.), 1 ♀ (SMF), coralslabs, 20 m., 21.ii.1986, leg. HGM.— Punta de la Aguja: 1 ♂, 2 ovig. ♀♀ (SMF), under stones, 3 m., 16.ix.1985, leg. HGM; 1 juv. ♂ (SMF), 0-1 m., 9.i.1986, leg. HGM; 1 ovig. ♀ (SMF), coralslabs, 18 m., 16.ix.1985, leg. HGM; 1 juv. ♂ (SMF), 20-25 m., 24.ix.1985, leg. HGM.— Punta Ancon, near Tanganga: 1 ♀ (SMF), coralslabs, 15 m., 2.viii.1985, leg. HGM.— Tayrona Parc, Bahia Concha: 6 ♂♂ (5 juv.), 7 juv. ♀♀ (SMF), *Sargassum*, 27.vi.1985, leg. HGM.— Bahia de Chengue: 5 juv. ♂♂, 4 ♀♀ (3 juv., 1 ovig.) (SMF), coralslabs, 4-6 m., 4.ix.1985, leg. HGM; 2 ♂♂ (1 juv.), 2 juv. ♀♀ (SMF), 7-8 m., leg. HGM; 1 ♂, 2 ovig. ♀♀ (SMF), 15-17 m., 21.i.1986, leg. HGM; 1 juv. ♂, 2 ovig. ♀♀ (SMF), 15-18 m., 20.ix.1985, leg. HGM; 1 ovig. ♀ (SMF), sandbottom dredge, 20-30 m., -1.1986, leg. Luz-Elena Velasquez T.— Playa oriental: 1 ♂, 1 juv. ♀ (SMF), under stones, 0.5 m., 4.iv.1986, leg. HGM.— Bahia de Gairaca: 2 juv. ♂♂, 1 juv. ♀ (SMF), *Thalassia*, 1-2 m., 17.i.1986, leg. HGM; 1 juv. ♂ (SMF), 2-3 m., 4.xii.1985, leg. HGM.— Bahia de Nenguangue: 1 ♂ (SMF), 18 m., 2.ix.1985, leg. HGM; 2 ♂♂, 1 ovig. ♀ (SMF), coralslabs, 11-16 m., 23.ix.1985, leg. HGM; 1 juv. ♂ (SMF), on hydroids and in corals, 8.x.1978, leg. H. & M. Türkay.— Bahia de Cinto: 3 juv. ♂♂ (SMF), *Thalassia*, 1-3 m., 5.ix.1985, leg. HGM.— Guachaquita: 3 ♂♂ (1 juv.) (SMF), coralslabs, 28.ii.1986, leg. HGM.— Arrecifes, Punta el Diamante: 4 ♂♂ (1 juv.), 2 ♀♀ (1 juv., 1 ovig.) (SMF), leg. HGM. Curaçao.— West Point: 1 ♂ (ZMA), 14.v.1920, leg. C.J. van der Horst.— Plaja Djerimi, N corner: 2 ♂♂ (1 juv.), 3 ♀ (2 juv., 1 ovig.) (RMNH D 7934), 1 juv. ♂, 1 juv. ♀ (RMNH D 36913), rocky shore with sand, 0-1.5 m., 11.xii.1948, sta. 1019, leg. PWH.— Plaja Hoeloe (Playa Hulu): 1 juv. ♀ (RMNH D 7939), sandy reef, *Acropora cervicornis* and *Porites*, 0.5-1.5 m., 28.x.1948, sta. 1023, leg. PWH.— Santa Martha: 2 ♀♀ (1 juv.) (RMNH D 36910), 1-4 m., 4.vii.1954, leg. PWH.— Santa Martha Bay, entrance, near St. Nicolaas: 4 ♂♂ (2 juv.), 2 juv. ♀♀ (RMNH D 36929), from coral blocks, 4.ii.1957, sta. 1083, leg. LBH.— Between Daai-Booi Baai and Porto Marie Baai: 1 juv. ♀ (RMNH D 36909), on and between colonies of *Stylaster roseus*, intertidal niche, 0.5-1 m., 1961, leg. P. J. Roos.— Bullenbaai: 1 ♂, 1 juv. ♀ (RMNH D 7936), 1950-1951, C. J. v.d. Meer.— Bay NW entrance Piscadera Baai: 1 ovig. ♀ (RMNH D 36931), on and in coralblocks, 0-0.5 m., 25.i.1957, sta. 1068, leg. LBH.— Piscadera Baai, entrance, near Willemstad: 17 ♂♂ (5 juv.), 15 ♀♀ (8 juv., 7 ovig.) (RMNH D 36927), sandy bottom or muddy sand, with rocks, on sponges, between algae, sponges, hydroids, tunicates etc., 0-1.5 m., 12.xi-xii.1956, sta. 1002, leg. LBH.— Piscadera Baai, entrance, NW: 7 ♂♂ (1 juv.), 8 juv. ♀♀ (RMNH D 36925), at column of sea anemone, between and in rocks, 23.i.1957, sta. 1060, leg. LBH.— Piscadera Baai, Boca Piscadera (outer bay): 4 ♂♂, 1 ovig. ♀ (RMNH D 7940), on fence and poles of swimming pool, 0-1 m., 29.i.1949, sta. 1029A, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NW part: 8 juv. ♂♂, 5 juv. ♀♀ (RMNH D 36919), muddy sand with rock debris, 1-1.5 m., 5.i.1964, sta. 1458, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), Carmabi Pier: 1 juv. ♂ (RMNH D 36912), iron and wooden poles, numerous *Spirobranchus*, 0-1 m., 14.x.1967, sta. 1620, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NE part, Carmabi beach: 1 ♂ (RMNH D 36917), sandy pebbles, some coral, 1-2 m., 5.i.1964, sta. 1457, leg. PWH.— Piscadera Baai, Boca Piscadera (outer bay), NE part: 1 juv. ♀, sand with a few limestone boulders, 3.5 m., 3.i.1964, sta. 1453, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), W: 1 juv. ♂ (RMNH D 36915), small sandy inlet with *Rhizophora*, *Didemnum* and other ascidians, 0-0.5 m., 14.xii.1963, sta. 1460, leg. PWH.— Piscadera Baai, Boca Piscadera (entrance), water-pipe: 1 ♂, 3 ♀♀ (1 juv., 2 ovig.) (RMNH D 36911), iron supports in tidal flow, with dense *Pennaria*, *Didemnum*, *Styela* and *Microcosmus*, 0-1 m., 2.i.1964, sta. 1462, leg. PWH.— Piscadera Baai, Boca Stroink (entrance), W side, N of water-pipe: 2 juv. ♂♂ (RMNH D 36918), sandy bottom with *Halimeda*, scanty *Thalassia*, 1 m., 14.xii.1963, sta. 1463A, leg. PWH.— Spaanse Water, mouth, near Nieuwpoort: 3 ♂♂ (1 juv.), 3 ♀♀ (2 juv., 1 ovig.) (RMNH D 36930), between algae, 25.xi.1956, sta. 1013, leg. LBH.— Fuik Baai, entrance, NW: 6 ♂♂ (4 juv.), 5 juv. ♀♀ (RMNH D 36928), under rocks, 0-1 m., 13.i.1957, sta. 1051, leg. LBH.— On the rocks of Kuijbasis: 1 ♂ (RMNH D 36908), under rocks, ca. 2 m., 7.iv.1958, leg. J. S. Zaneveld.— Caracas Baai: 1 ovig. ♀ (ZMA), 7.iv.1920, leg. C.J. van der Horst; 1 juv. ♂, 1 juv. ♀ (ZMA), from a stone at the shore, 30.iv.1920, leg. C.J. van der Horst; 1 juv. ♀ (ZMA), in coral, leg. C.J. van der Horst.— Santa Cruz Baai: 1 juv. ♂ (ZMA), 23.iv.1930, leg. PWH. Bonaire.— Slagbaai: 1 ovig. ♀ (RMNH D 7933), up to 2 m., 12.ix.1948, leg. PWH.— In front of Goto Meer: 1 juv. ♂, 1 juv. ♀ (RMNH D 30363), between *Acropora palmata* zone

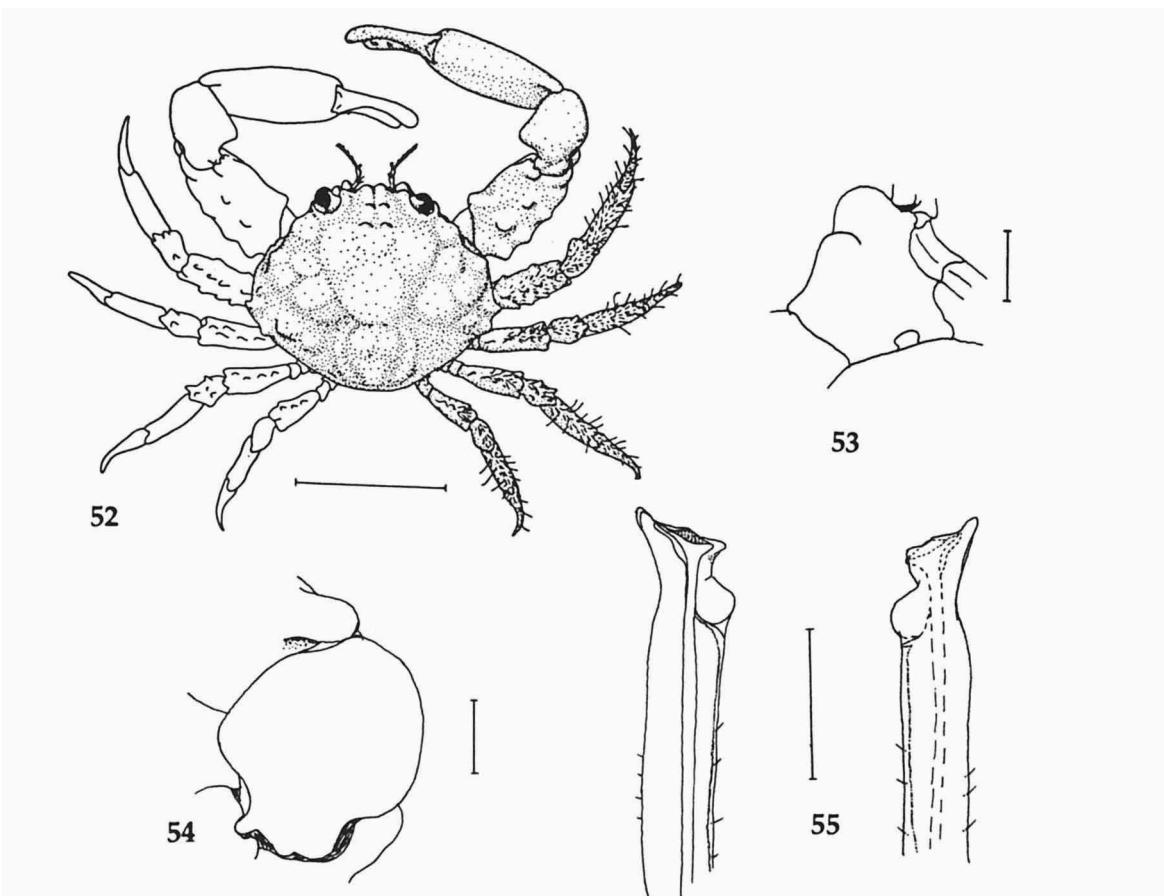
and stony beach, shallow water, commensal of *Stichodactyla helianthus*, 11.iv.1973, leg. J. C. den Hartog.— Paloe Lechi (Playa Lechi), overflow of Salinja: 1 juv. ♀ (RMNH D 7938), sandy reef, 1-2.5 m., 4.ix.1948, sta. 1056C, leg. PWH; 1 juv. ♀ (RMNH D 7932), rocky beach with some sand, 0.25-1 m., 4.ix.1948, sta. 1056B, leg. PWH.— Near De Hoop, S of Kralendijk: 1 ovig. ♀ (RMNH D 36920), limestone cliff with sandy reef, 0-1.5 m., 11-12 & 16-17.v.1930, sta. 1058, leg. PWH; 2 ♂♂ (1 juv.), 1 juv. ♀ (RMNH D 7931), sandy reef, 1-3 m., 10.ix.1948, sta. 1058C, leg. PWH.— De Hoop, near Kralendijk: 6 ♂♂ (5 juv.), 3 ♀♀ (2 juv.) (ZMA), 30.x.1930, leg. PWH; 2 ♂♂ (1 juv.), 1 juv. ♀ (ZMA), 6.xi.1930, leg. PWH; 5 ♂♂ (4 juv.), 2 juv. ♀♀ (ZMA), 11.xi.1930, leg. PWH.— Paloe Lechi beach, N of Kralendijk: 1 juv. ♂ (RMNH D 36926), in pools with algae, sea anemones, etc., 5.iii.1957, sta. 1137, leg. LBH.— Lac, Boca: 3 ♂♂ (1 juv.), 2 juv. ♀♀ (RMNH D 7941), 1-2 m., 1.x.1948, sta. 1068, leg. PWH. Klein Bonaire.— E coast of Landing: 3 ♂♂ (2 juv.), 6 juv. ♀♀ (RMNH D 7935), rocky shore at sandy beach, 0-1 m., 13.ix.1948, sta. 1049A, leg. PWH; 1 juv. ♀ (RMNH D 7937), reef debris on sandy beach, 0-1.5 m., 11.ix.1948, sta. 1049B, leg. PWH.— W coast, W Point: 1 ♂ (RMNH D 36921), beachrock with sandy reef, 0-1 m., 28.iii.1955, sta. 1367, leg. PWH.— On beach near Landing: 4 ♂♂ (1 juv.), 3 ♀♀ (2 juv., 1 ovig.) (RMNH D 36922), 10.iii.1957, sta. 1147, leg. LBH. Tobago.— Buccoo Reef: 3 ♂♂ (1 juv.) (RMNH D 36916), *Porites*-flat with *Acropora*, 0.5-1 m., 16.i.1955, sta. 1387, leg. PWH.

Description.— The carapace in adults is broader than long, while in small specimens it is nearly as long as broad. It is rather convex and the branchial sulci on its surface are broken up by transverse grooves. The rostrum is little advanced, incised by a narrow notch. The basal antennal segment has two spines, of which the second comprises one third of the length of the first, and is situated at the base of the latter. The antennae are 0.13 times as long as the carapace. The orbit is only armed with two (or three) lobes above. These two lobes consist of one preorbital lobe, one postorbital lobe, and sometimes a third lobe is situated anteriorly at the base of the postorbital lobe. The carapace has three anterolateral spines and one posterolateral spine, the first three anterolateral spines increase in size posteriorly, the posterolateral spine is the smallest spine of all.

The chelipeds of the male are much stouter and 1.5 times as long as the first pair of ambulatory legs; the merus is triangular in transverse section, with four spines or tubercles on the outer or posterior margin, one prominent spine on the inner or anterior upper margin and two spines or tubercles and in between two tubercles op spines these two rows; the carpus is smooth but with a distal angle on the inner or anterior margin; the palm is smooth and compressed; the fingers have a long and wide gape, the cutting edges are denticulate; there is a large tooth on the dactylus halfway the gape. No large tooth has been observed on the propodus, but instead there are two denticles that are larger than usual. No bundles of hairs are present on the inner or outer margins of the spooned tips. In the female the fingers are not denticulate at all. The first pair of ambulatory legs is 1.25 times as long as the carapace (including the rostrum). The ambulatory legs are covered with short stout hairs. On the upper margin of the merus there are two rows of spines, five spines on the anterior upper margin, six spines on the posterior upper margin. The carpus carries two rows of two spines on its upper margin.

The male gonopod is long, stout and straight. It is dorsoventrally flattened, a row of hairs is present on the inner and outer lateral margin of the proximal half, and in the distal half the inner margin has a wide, but deep, incision, behind a large rounded lobe. The part distally of the incision widens again and then abruptly tapers to a sharp tip at the outer margin. The genital opening of the female is on the inner anterior part of the genital prominence.

Measurements.— The largest specimen at my disposal is an adult male of 14.8



Figs. 52-55. *Mithraculus ruber* (Stimpson, 1871): 52. dorsal view of the animal (after Velez, 1977), 10 mm indicated; 53. right basal antennal segment (RMNH D 36915), 1 mm indicated; 54. carpus of the right cheliped (RMNH D 36915), 2 mm indicated; 55. detail tip of right 2nd gonopod in caudal (left) and cephalic (right) view (RMNH D 36915), 1 mm indicated.

mm long (including the rostrum) and 18.3 mm wide (including the spines) (RMNH D 36908).

Colour.— All specimens, in spirit, of this species at my disposal were cream to yellowish brown with sometimes red spots on the branchial regions. Stimpson (1871) gives the colour in life as a chestnut-red carapace with some bluish posteriorly.

Remarks.— This species is very variable in the length and width ratio of the carapace. As there are no spines at the widest part of the carapace, the specimens generally look somewhat less broad than long. However, actually the reverse is true. Due to (1) the fact that the upper surface of the carapace seems naked to the unaided eye, (2) the type of stiff setae present on the ambulatory legs, (3) the shape of the basal antennal segment, and (4) the non diverging lateral spines, this species can be distinguished from juveniles of *Mithrax* species.

The species described by Jones (1969: 381) as *M. humphreyi* in my opinion must be assigned to *Mithraculus ruber*. Although his description is far from complete, the

species was not figured, and I could not examine the types, the few characters given by Jones justify the provisional relegation of the species to the synonymy of *Mithraculus ruber*. The carapace dimensions (length 15 mm, width 16 mm), the presence of a tubercle on or above the posterolateral margin of the carapace, and the unarmed palm in *M. humphreyi* are typical characteristics of *M. ruber*. Jones' colour description resembles more that of *M. ruber* than of any other species, and if his remark that the carpus is relatively smooth refers to the carpus of the cheliped, there can hardly be any doubt about its identity. Jones (p. 382) also mentions that he did not find *M. ruber* in Barbados although it had been found there previously (Rathbun, 1921, 1925).

Like the other *Mithraculus* species this species has also been reported to be associated with certain species of Porifera and Coelenterates, however no specific names are given (see Rathbun, 1924, 1925; Powers, 1977). In the material examined the species was collected as 'commensal' of the sea anemone *Stichodactyla helianthus* (Ellis) by J. C. den Hartog (RMNH). It is further found associated with the corals *Porites* spec., *Acropora cervicornis* (Dana) and *Stylaster roseus* (Pallas). It seems likely that these associations are rather loose.

Distribution.— The species has previously been reported from: Gulf of Mexico (Powers, 1977), Bahamas (Schmidt, 1939), Cuba (Stimpson, 1871; Rathbun, 1925), Dominican Republic, Hispaniola (Bonelly de Calventi, 1974), Puerto Rico (Rathbun, 1901, 1925), St. Thomas (Rathbun, 1925), Antigua (Rathbun, 1925), Guadeloupe (Rathbun, 1925), Barbados (Rathbun, 1921, 1925; Jones, 1969), Curaçao (Rathbun, 1924, 1925), Colombia (Coventry, 1944; Vélez, 1977), and Venezuela (Chace, 1956; Rodriguez, 1980). The species seems to be absent on the mainland of the U.S.A.

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<i>Mithraculus ochraceus</i>	48, 52	<i>Mithrax forceps hirsutipes</i>	48
<i>Mithraculus ruber</i>	33, 52, 53-57	<i>Mithrax hemphilli</i>	5, 6, 12, 23-25
<i>Mithraculus sculptus</i>	32, 33, 42, 43-48	<i>Mithrax hirsutipes</i>	48
<i>Mithrax</i>	4, 5, 7	<i>Mithrax hispidus</i>	6, 15, 17-23
<i>Mithrax (?) leucomelas</i>	32	<i>Mithrax hispidus var. pleuracanthus</i>	18
<i>Mithrax (Mithraculus) cinctimanus</i>	34	<i>Mithrax holderi</i>	6, 10-12, 25
<i>Mithrax (Mithraculus) commensalis</i>	34	<i>Mithrax humphreyi</i>	52
<i>Mithrax (Mithraculus) coronatus</i>	37	<i>Mithrax laevimanus</i>	18, 23
<i>Mithrax (Mithraculus) coryphe</i>	37, 48	<i>Mithrax leucomelas</i>	32
<i>Mithrax (Mithraculus) forceps</i>	43, 48	<i>Mithrax minutes</i>	43
<i>Mithrax (Mithraculus) hirsutipes</i>	48	<i>Mithrax minutus</i>	44
<i>Mithrax (Mithraculus) ruber</i>	52	<i>Mithrax nudus</i>	52
<i>Mithrax (Mithraculus) sculptus</i>	43	<i>Mithrax pilosus</i>	5, 6, 25-29, 32
<i>Mithrax (Mithrax) ? verrucosus</i>	29	<i>Mithrax pleuracanthus</i>	18, 22
<i>Mithrax (Mithrax) aculeatus</i>	26	<i>Mithrax plomosus</i>	29
<i>Mithrax (Mithrax) acuticornis</i>	7	<i>Mithrax rubei (sic)</i>	52
<i>Mithrax (Mithrax) bahamensis</i>	10	<i>Mithrax ruber</i>	52
<i>Mithrax (Mithrax) brasiliensis</i>	13	<i>Mithrax sculptus</i>	36, 43
<i>Mithrax (Mithrax) caribbaeus</i>	18	<i>Mithrax spinicinctus</i>	18
<i>Mithrax (Mithrax) cinctimanus</i>	34	<i>Mithrax spinosissima</i>	15
<i>Mithrax (Mithrax) cornutus</i>	7	<i>Mithrax spinosissimus</i>	6, 9, 14-17, 25, 26
<i>Mithrax (Mithrax) coronatus</i>	37	<i>Mithrax subspinosus</i>	10
<i>Mithrax (Mithrax) depressus</i>	18	<i>Mithrax tortugae</i>	18, 22
<i>Mithrax (Mithrax) forceps</i>	48	<i>Mithrax trispinosus</i>	29
<i>Mithrax (Mithrax) hemphilli</i>	23	<i>Mithrax verrucosus</i>	5, 6, 28, 29-32
<i>Mithrax (Mithrax) hispidus</i>	18	<i>Mithrax verrucosus var.</i>	26
<i>Mithrax (Mithrax) holderi</i>	10	<i>Nemausea</i>	5
<i>Mithrax (Mithrax) laevimanus</i>	18	<i>Nemausea rostrata</i>	7
<i>Mithrax (Mithrax) leucomelas</i>	32	<i>nudus, Mithraculus</i>	52

<i>nudus, Mithrax</i>	52	<i>sculptus, Mithrax (Mithraculus)</i>	43
<i>nudus, Mithrax (Mithrax)</i>	52	<i>sculptus, Mithrax (Mithrax)</i>	43
<i>ochraceus, Mithraculus</i>	48, 52	<i>spinicincta, Maia</i>	17
<i>pilosus ?, Mithrax (Mithrax)</i>	26	<i>spinicinctus, Mithrax</i>	18
<i>pilosus, Mithrax</i>	5, 6, 25-29, 32	<i>spinipes, Maja (Mithrax)</i>	29
<i>pilosus, Mithrax (Mithrax)</i>	26	<i>spinipes, Pisa</i>	5
<i>Pisa spinipes</i>	5	<i>spinosisima, Maia</i>	14
<i>pleuracanthus, Mithrax</i>	18, 22	<i>spinosisima, Maja (Mithrax)</i>	15
<i>pleuracanthus, Mithrax (Mithrax)</i>	18	<i>spinosisima, Mithrax</i>	15
<i>pleuracanthus, Mithrax hispidus var.</i>	18	<i>spinosisimus, Mithrax</i>	6, 9, 14-17, 25, 26
<i>plumosus, Mithrax</i>	29	<i>spinosisimus, Mithrax (Mithrax)</i>	15
<i>rostrata, Mithrax (Nemausa)</i>	7	<i>subspinosus, Mithrax</i>	10
<i>rubei (sic), Mithrax</i>	52	<i>tortugae, Mithrax</i>	18
<i>ruber, Mithraculus</i>	5, 33, 52, 53-57	<i>tortugae, Mithrax (Mithrax)</i>	18
<i>ruber, Mithrax</i>	52	<i>Trachonites</i>	5
<i>ruber, Mithrax (Mithraculus)</i>	52	<i>trispinosus, Mithrax</i>	29
<i>ruber, Mithrax (Mithrax)</i>	52	<i>tuberculatus, ? Mithrax</i>	29
<i>sculpta, Maia</i>	43	<i>verrucosa, Maja (Mithrax)</i>	18
<i>sculpta, Maja (Mithrax)</i>	36	<i>verrucosus var., Mithrax</i>	26
<i>sculptus, Mithraculus</i>	32, 33, 42, 43-48	<i>verrucosus, Mithrax</i>	5, 6, 28, 29-32
<i>sculptus, Mithrax</i>	36, 43	<i>verrucosus, Mithrax (Mithrax)</i>	29